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CLINICAL MEDICINE

For MRCP PACES and FCPS

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الحمد لله

اللهم صل على سيدنا محمد وسلم

PREFACE

Medicine is a vast and continuously updating subject. For preparation of various examinations in internal medicine like FCPS, MRCP PACES etc., there are many books available. Students have to read many of these books for clearing their exams as no single book can meet their requirement. The idea for this book was to provide a single platform to the students to meet exam requirements and to make sure the exam oriented medical learning and practice.

The sole purpose of this book is to help the candidates with good intention purely for Allah & we have no monitory benefit out of it. The students are, however, advised to get the most current information available from various sources. The author(s), editor(s) and publisher do not assume any liability for any injury &/or damage incurred to person(s) or property resulting from or related to use of material published in this book.

Lastly, we are very thankful especially to our parents and teachers, family, friends & colleagues who always encouraged & guided us.

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LONG CASES

A. History taking approach

Introduction, consent and information sharing

- *"Hello! Good morning sir. Dr _____________ is my name. Pleased to meet you...... I have been asked to talk to you and do your examination, is that ok? ...... Can I ask your name? ...... How old are you? ...... And what do you work as a? .... Right. "* ***OR***

  "Hello! Good morning. My name is Dr _____________. Are you Mr/Mrs____________? ..... Nice to meet you.... Well, I have been asked to talk to you and do your examination .... Is that fine?"

  Can ask about residence, education, OPD or indoor case (If admitted then via OPD or ER)

  Remember: use your last name in introduction.

PRESENTING COMPLAINT (CHIEF COMPLAINT)

- *"And how can I help you? ..... Can you tell me about what is going on that brings you today? .... Ok. Would you like to tell me a little bit more details about your problem? ...... and did you notice anything else apart from that?"* ***OR***

  "Right, I understand you have ...... Is that correct? ..... Please tell me more about it"

  Always start taking history with open ended questions allowing the patients to narrate their story. Gently bring them back towards the important points by sign posting if they stray off the relevant discussion. Always record the history in the own words of the patient instead of using medical terms.

HISTORY OF PRESENTING COMPLAINT

Remember make mind of 3 differential diagnosis based on chief complaint.

D	O	P		S	A	R	E	A*
Duration	Onset	Progression		Severity Impact on daily life / sleep	Aggravating Factors	Relieving Factors	Ever had it before	Associations

*A: Ask about 3 differential diagnosis questions. Ask all questions of the system under discussion here from systemic inquiry list and tick it out from below.

For pain:

S	O	C	R	A	T	E	S
Site	Onset (Gradual / sudden)	Character	Radiation	Association	Timings / duration	Exacerbating / alleviating factors	Severity (How bad it is?) 1-10

SYSTEMIC ENQUIRY

- *"There are few more screening questions which I ask everybody who is not feeling very well and might not directly related to your problem but sometimes helpful ...... Is that fine with you?"*

General questions:

- *"Do you have any fever, night sweats, loss of weight, or loss of appetite?"*
- *"Any lumps or bumps in the body?"*
- *"Any Itching or rash?"*

Cardiorespiratory symptoms:

- *"Do you have any cough .... dry or coughing up phlegm, any blood in phlegm?"*
- *"Any shortness of breath?"* (If breathless then ask following)
  - *"Do you have breathlessness on walking or even at rest? ...... How much distance can you walk on flat at normal pace before stopping? ..... And before the illness? .... How many flights of stairs can you walk up before stopping? .... And before the illness? .... Are you short of breath while doing activity of daily living?"* ***(Quantify)***

  - *"Do you have breathlessness on lying flat? ... How many pillows you have to use to sleep to prevent breathlessness?"* ***(Orthopnea)***
  - *"Do you wake up at mid night because of breathlessness"* ***(Paroxysmal nocturnal dyspnea)***
- *"Any wheeze?"*
- *"Any Chest pain?"*
- *"Any racing or thumping of heart in the chest? ...... How fast it is? .... Do it tap out of the rhythm? ..... Can you tap it out on the desk? ..... Have you felt any missed beat? ...... Did the next beat feel heavier?"* ***(Palpitations)***
- *"Any ankle swelling? ...... How far it extends upwards .... Up to your shins or thigh or lower back?"* ***(Quantify)***

Gastrointestinal symptoms: **(think of symptoms from mouth to anus)**

- *"Any problem of heart burns or indigestion?"*
- *"Any problem with swallowing at all?"*
- *"Any tummy pain at all?"*
- *"How has the appetite been? ..... Have you lost weight during recent months? ...... and you are not trying to diet recently"*
- *"How are your bowel habits?" (Constipation, diarrhoea or change in bowel habit)*

If diarrhea:

  - *"Since how long? ..... Progression since onset? ...... How many times you are going to toilet? ..... Any relation with food? ...... Had you any problem with your bowel before or tummy at all before that?"*
  - *"Does it contain any undigested food? ...... Can you tell me about its color? ...... Did you see any blood on stools or on the toilet paper? .... Was it bright red or black? .... Was it coating the stools or was mixed in the stools? Any mucus or slime in it?"*
  - *"Do you have to get up at night to pass the motion?"*
  - *"Any pain at the back passage?" (rectal pain)*
  - *"Do you feel incomplete evacuation of the bowels?" (tenesmus)*
  - *Urgency*
  - *Incontinence*
- *"Anything else you have noticed at all?"*
- *"Any operations on your tummy?"*

Genitourinary symptoms:

- *"Any problem with the waterworks, any stinging on passing the water?"*
  - *"How often you pass the water? Are you passing large volumes? Do you have to wake up at night to pass it? Do you have any difficulty in starting micturition (hesitancy)?"*
  - *"Color, blood, frothing?"*
  - *"Incontinence, retention, terminal dribbling?"*
- *"Any problem related to your monthly periods?"*
  - *"Frequency, regularity, duration, heavy or light, painful?"*

Neurological symptoms:

- *"Any dizziness, fits, faints or funny turns?"*
- *"Are your arms or legs weaker than normal?"*
- *"Any problem in maintaining balance or spinning of things around?" (vertigo)*
- *"Any speech problem?"*
- *"Any swallowing difficulty?"*
- *"Any numbness or 'pins and needles'?" (paraesthesia)*
- *"Any loss of control over your bladder or bowel?"*

Musculoskeletal symptoms:

- *"Any pain, swelling or stiffness of joints?"*
- *"Any rashes, mouth sores, eye redness or grittiness, bluish discolouration of hands?"*

Thyroid symptoms:

- *"Any heat intolerance or preference to cold weather; any weight loss despite good appetite, shaking of hands or racing of heart?"* ***(hyperthyroidism)***
- *"Any cold intolerance or preference to warm weather, any weight gain despite poor appetite, any change in voice or croaky voice, heavy periods, constipation, dry skin?"* ***(Hypothyroidism)***

PAST MEDICAL HISTORY

- *"I am going to ask you now a little bit more regarding your general health. Have you had any problem that you let me know about?"*
- *"Have you ever been hospitalised for any medical or surgical reasons?"*

A	O	D		P	T
Admissions	Operations & anaesthetic complication	Dental procedures		Pregnancies & complications (high BP, high sugar, fits)	Transfusions & transfusion reaction

- *"There is list of few diseases that I ask everybody else."*
    - *"Do you have any problems like angina or any other heart problems or stroke?"*
    - *"Diabetes or high BP or raised blood fats?"*
    - *"Any asthma or allergies or tuberculosis?"*
    - *"Any jaundice in the past?"*

M	J		T	H	R	E	A	D	S
MI / Valvular disease	Jaundice		TB	High BP	Rheumatic fever	Epilepsy	Asthma / allergy	Diabetes	Stroke

FAMILY HISTORY

- *"Any similar complaints in your other family members?"* ***(MJ THREADS)***
- *"Any other significant illnesses that runs in your family?"*

DRUG HISTORY + TREATMENT HISTORY + INVESTIGATIONS

- *"Are you on any regular medications at present? ..... Which medicines? ..... Can you please show me the list of medicines that you are taking?"*
- *"Any 'over-the-counter' medications or herbal remedies, or oral contraceptives?"*
- *"Do you have any drug allergy or drug intolerance? .... With which drug? ..... What you have experienced?"*

PERSONAL HISTORY / SOCIAL HISTORY

"Is that alright if I ask you some personal questions?"

- *"What about your job? ..... How much is your income? .... How many dependants you have? .... Who is paying for the treatment ... self-payed, insurance company or government?"* ***(Job & affordability)***
- *"Do you live by yourself at home?* (Living alone or with family) *...... Are you in relationship with someone?* (ask about close relative marriage; extramarital affairs, whether safe sexual practices, about sexual preferences) *......"* ***(marital status)***
- *"What about yours living? ..... Do you have to walk up on stairs?"* (If relevant ask about number of rooms and number of occupants; facilities of life like water, electricity) ***(Living)***
- *"Do you require any walking aids? .... Who does the cooking and shopping? ...... What cannot you do because of your illness?"* ***(mobility and daily chores of life)***
- *"Who else is there at home to look after you? ...... Who visits you? ... Relatives, neighbours, GP or nurse?* ***(social support)***
- *"What is the impact of the disease on your family and work?*
- *"Do you smoke or drink? ..... Any recreational drugs or prohibited drugs taking in the blood channels? ..... How much? ..... Since how long? ..... When stopped? ......"* The CAGE questionnaire for alcoholism (cut down, annoyed, guilt, eye opener in the morning). Smoking is quantified in terms of pack-years: 1 pack year is smoking 20 cigarettes/day for 1 year.

- *"Do you drive? ..... Is that private vehicle or else?"* (if relevant)
- *"Any recent travel?"*
- *"Any pets at home?"*

▶ RECAP

- *"So, if I can just tell you what you have let me know so far .... is anything else you would like to add which I might have missed?"* ***(Summarise everything told by the patient)***
- *"Do you have any idea of the underlying problem?"*
- *"Do you have any particular concern at the moment?"*
- *"Why you think like this? .... Did anyone mention this possibility?"*

▶ EXPLAIN

B. HISTORY TAKING SKILLS

1. Abdominal swelling
2. Ankle swelling
3. Asymptotic hypertension
4. Back pain
5. Breathlessness
6. Burning of the feet
7. Chest pain
8. Cold and painful fingers
9. Collapse? Cause
10. Chronic confusion (forgetfulness)
11. Cough
12. Diabetic foot
13. Difficulty in walking
14. Dizziness or feeling faint
15. Double vision
16. Dysphagia
17. Epigastric pain and nausea
18. Facial swelling
19. Funny turns
20. Haemoptysis
21. Headache
22. Hoarse voice
23. Hypercalcaemia
24. Hyperlipidaemia
25. Jaundice
26. Joint pains
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40. Tiredness with daytime sleepiness
41. Tremors
42. Visual disturbances
43. Vomiting
44. Weakness of the right arm
45. Weight gain
46. Weight loss
47. Weight loss and chronic diarrhoea
48. Wheeze

1. Abdominal swelling

Your role: You are the doctor in a general medical clinic

Patient: Mr. Adnan Ibrahim, 55 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.[1]

Referral text / Clinical problem:

This 55-year-old man has progressively increasing abdominal distention without any jaundice over last 4 weeks. He is a teetotaler.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.[2]

▶ HISTORY (CHIEF COMPLAINTS)

Details of abdominal swelling:

- *"Is it generalized or focal?"*

- **Duration:** *"Since how long you have abdominal distention?"*
- **Onset:** *"Did it develop abruptly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How much the girth of your tummy has increased? Does it cause breathing difficulty or abdominal discomfort or pain?"*
- **Associations (Differential diagnosis):**
  - ***Cirrhosis:*** *"Do you have any yellow discoloration of whites of your eyes or high coloured urine? ... Any blood in vomiting or stools?"* ***(search the cause of cirrhosis)***
  - ***Budd-Chiari syndrome (Hepatic vein thrombosis):*** *"Did abdominal distention develop abruptly?"*
  - ***Abdominal malignancy:*** *"Any change in your bowel habit? .... Weight loss or loss of appetite? ... Any lumps in groin, armpits or neck? .... Any exposure to asbestos (peritoneal mesothelioma)?"*
  - ***Tuberculosis peritonitis:*** *"Any fever, night sweats, tummy pain, loose stools?"*
  - ***Nephrotic syndrome, CCF:*** *"Any frothing in urine? .... Any chest pain?"*
  - ***Pancreatitis:*** *"Any tummy pain?"*

---

[1] This is the pattern of instructions commonly given in MRCP Ireland clinical examination. All the next history taking skills described in this section are based on this pattern. Albeit, there is slight difference of time duration given in other examinations like MRCP UK PACES and FCPS Pakistan clinical examination.

[2] The task assigned to candidates appearing in MRCP UK PACES during history taking skills. All the next history taking skills in this section are based on similar pattern.

  - ***Others:*** *Fat (obesity), Flatus (gaseous distension), Fetus (pregnancy), Fluid (ascites), intra-abdominal masses.*

▶ INVESTIGATIONS:

- **Ascitic fluid tap:** Tap 50 mL ascitic fluid for cytology, microscopy, alcohol- and acid-fast bacilli (AAFB) and amylase
  - Color:
    - ***Haemorrhagic:*** malignancy, acute pancreatitis and abdominal trauma
    - ***Straw-coloured:*** cirrhosis, infective causes, congestive cardiac failure, nephrotic syndrome and hepatic vein obstruction.
  - ***Neutrophil count:*** > 250 cells per mm^3 in bacterial peritonitis
- **USG abdomen**
- **CECT scan abdomen**

▶ TREATMENT:

- **Cirrhosis**:
  - Reduce sodium intake
  - Diuretics
  - Fluid restriction

2. Ankle swelling

Your role: You are the doctor in a cardiology clinic

Patient: Miss Faiza Kousar, 30 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This young non-smoker lady has 02 years history of SOB and chest pain, which have worsened over the last 02 months. She was thought to have asthma and was on inhalers for the last 02 years. She has now developed ankle swelling (pulmonary hypertension).

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of SOB:

- **Duration:** *"Since how long you have shortness of breath?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ……. How much distance can you walk on flat at normal pace before stopping? …. And before your illness? ……….. How many flight of stairs can you walk up before stopping? …. And before your illness? ……….. Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better?"*
- **Associations (Differential diagnosis):**

Details of chest pain:

- **Site:** *"Where exactly the pain is?"*
- **Onset:** *"Did it develop suddenly or gradually? ….. What were you doing at that time?"*
- **Character:** *"What type of pain it is? …. chest heaviness with profuse sweating, sharp, stabbing, burning, or band-like heaviness? ……. Does it appear on breathing or on movements? …… Do you feel pain on pressing the area where you have it?"*
- **Radiation:** *"Does it move anywhere else like your left arm, neck, jaw or back?"*
- **Association (D/D):**
  - ***IHD:*** *"Do you have chest pain at rest, or it appears on exertion? …… Does it stop after stopping exertion and returns on restarting? …… Does it appear walking uphill or climbing stairs? ….. How many meters can you walk on the flat before it appears?"*
  - ***Musculoskeletal:*** *"Does it increase on pressing or movements?"*
  - ***Pleuritic:*** *"Does it worsens on taking deep breath in?"* ***(pulmonary embolism, pneumonia)***
  - ***Pericardial:*** *"Does it worsens on lying flat?"*
  - ***GERD:*** *"Any relation to eating or hunger?"* ***(APD)***
  - ***Spinal mass or disc herniation:*** *"Does it appears on coughing or sneezing?"*

- **Timings:** *"Since how long you have the chest pain? ...Is it constant, or comes and goes?"*
- **Exacerbating or relieving factors:** *"what makes it better? ..... What makes it worse? Does it aggravate on exertion or breathing or movements and relieve with rest?"*
- **Severity:** *"How bad is the pain on a scale of 1-10?"*

Details of ankle swelling:

- **Duration:** *"Since how long you have ankle swelling?"*
- **Progression:** *"is it getting worse over time?"*
- **Severity:** *"Do you have swelling in one or both legs? ..... Do you have difficulty in putting the shoes on? ...... How far it extends upwards? ..... Up to your shins or thigh or lower back?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes it worse?"*
- **Associations (D/D for pulmonary hypertension):**
    - ***Bronchial asthma:*** *"Do you have cough, wheeze, or any diurnal variation of symptoms of cough and wheeze, any allergy to common household allergens like cats, house dust mite, and pollen?"*
    - ***Primary pulmonary hypertension:*** *"Any family history of chest pain with shortness of breath and ankle swelling?"* ***(family history of primary pulmonary hypertension)***
    - ***Secondary pulmonary hypertension:***
        - **Chest:**
            - Recurrent pulmonary embolism: haemoptysis, any recent air flights
            - Chronic lung condition like bronchiectasis: chronic cough and sputum
        - **Heart:**
            - Congenital or valvular heart disease like mitral valve disease: syncope and palpitations
        - **Collagen vascular diseases:**
            - SLE, Scleroderma: joints
        - **Drug induced:**
            - Weight reducing appetite suppressants: Fenfluramine
        - **Sexual: ...HIV**
            - Pneumocystis carinii pneumonia
        - **Social: ...Job**

▶ INVESTIGATIONS (EXPLAIN THESE TO THE PATIENT)

- **CXR:** Prominent central pulmonary arteries with clear lung fields
- **ECG:** RAD & RVH
- **Echocardiogram:** enlarged right ventricular cavity, small sized left ventricular cavity, septal abnormality indicative of right ventricular pressure overload
- **Lung function test with diffusing capacity**
- **Ventilation-perfusion scan**
- **Right heart catheterization:** resting pulmonary artery pressure > 25 mmHg and pulmonary capillary wedge pressure (PCWP) < 15 mmHg indicates idiopathic pulmonary hypertension.

▶ MANAGEMENT

To be done by a cardiologist with a special interest in pulmonary hypertension.

- **Vasoreactivity test:** it determines the effectiveness of oral calcium channel blocker by checking the responsiveness to short acting vasodilators which act by reducing the pulmonary vascular resistance.
- **Vasodilatory drugs:**
    - Prostacyclins (epoprostenol, treprostinil)
    - Endothelin receptor antagonist (bosentan)
    - Phosphodiesterase-5 inhibitors (sildenafil, vardenafil or tadalafil)
- **Heart and lung transplantation**
- **Anticoagulation:** indicated in idiopathic pulmonary hypertension due to chronic thromboembolism.

3. Asymptotic hypertension

Your role: You are the doctor in a general medical clinic

Patient: Mr. Tariq Basheer, 35 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This young man is found hypertensive without any symptoms. Albeit, he does have anxiety attacks.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of hypertension

- **Duration:** *"Do you have raised blood pressure before, or it is the first time you were found to have it? When and how you were diagnosed to have hypertension? What medications do you take to control your BP? Is the control optimum with medications?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How high does it go?"*
- **Aggravating factors:** *"What makes it high?"*
- **Relieving factors:** *"What makes you feel better?"*
- **Association (D/D):**
  - ***Anxiety provoked:***
    - *"Do you have any stress at your work or home like any marital strife?"*
    - *"Do you feel anxious while visiting the doctor? Have you ever checked your BP at home? Do you have a normal BP reading there?" ('White-coat' induced)*
  - ***Essential hypertension:***
  - ***Secondary hypertension:***
    - **Renal:** Chronic GN, diabetic nephropathy, renal artery stenosis, polycystic disease, and chronic tubulointerstial nephritis.
    - ***Endocrine:***
      - Conn's syndrome, adrenal hyperplasia
      - **Pheochromocytoma:** *"Do you feel racing of your heart, profuse sweating, headache, faints or funny turns on standing from sitting position at the time of raised BP, panic attacks?"*
      - **Cushing's syndrome:** *"Do you have any skin changes like thinning, striae or bruising; hair growth/acne; difficulty in climbing stairs or standing up from a sitting position; irregular or missed menstrual periods, poor libido; worsening diabetes; bony fractures?"*
      - **Acromegaly:** *"Any progressive enlargement of body parts with increase in ring or hat size?"*
  - ***Cardiovascular:*** coarctation of the aorta
  - ***Drug induced:*** OCPs, steroids, NSAIDs, sympathomimetics, liquorice
  - ***Pregnancy induced:*** Don't forget to ask in a young woman.
- **Complications of hypertension:** *"Do you have any symptoms like Headache, vision problem (blurred vision), chest pain, difficulty in breathing, palpitations, pain in legs especially on walking, ankle oedema, urinary symptoms?"* (There may be no relevant symptoms unless hypertension has resulted in end-organ damage)
- **Side effects of anti-hypertensives & non-compliance:** *"Do you have any erectile dysfunction?"*

(Ask about the side effects of bendroflumethiazide and address the issue of non-compliance if any)

Remember: Discuss with the patient following

- Importance of BP control as it will improve compliance.
- Moderating alcohol consumption, smoking cessation
- Diet and exercise

▶ INVESTIGATIONS (EXPLAIN TO THE PATIENT)

- Urea and electrolytes
- Lipid profile
- Urine dipstick
- Fundoscopy
- CXR
- ECG
- 24-h ambulatory BP monitoring

▶ FOLLOW-UP (WILL HAVE TO BE ARRANGED TO DISCUSS)

- The results of the 24-h ambulatory measurements
- Anxiety control, e.g. relaxation training from a psychologist.

Discussion

NICE and British Hypertension Society joint guidelines

- If clinic BP >140/90 mmHg, offer ABPM before confirming the diagnosis of hypertension, consisting of average of 14 readings monitored twice a day for 7 days during waking hours.
- **Normal daytimes average ABPM OR HBPM BP:** (during person's usual waking hours)
  - < 80 years: < 135 / 85 mmHg
  - > 80 years: < 145 / 85 mmHg
- **Categories of hypertension:**
  - **Stage 1:** clinic BP >140/90 mmHg and ABPM average >135/85 mmHg
  - **Stage 2:** clinic BP >160/100 mmHg and ABPM average >150/95 mmHg
  - **Severe:** clinic systolic BP >180 mmHg or clinic diastolic BP >110 mmHg.
- **Treatment:**

  Antihypertensive drugs are advised for patients < 80 years with stage 1 hypertension + any evidence of end-organ damage or other cardiovascular risk factors. Patients of any age with stage 2 hypertension should be offered antihypertensive treatment.
  - **Patients < 55 years:** ACEI (or ARB if ACEI poorly tolerated). Add a calcium channel blocker (CCB) or, if not tolerated, a thiazide-like diuretic if additional treatment is required.
  - **Patients > 55 years / Afro-Caribbean of any age:** CCB or thiazide-like diuretic (if CCB not tolerated). Add an ACEI (or ARB if Afro-Caribbean) if additional treatment is required.
  - **Step 3 treatment:** ACEI (or ARB), CCB and thiazide-like diuretic. Consider low-dose spironolactone or a-blocker if further treatment is required (keep a close eye on potassium levels if spironolactone is added).
  - **Patients < 40 years:** Investigate for secondary hypertension and assess for target end-organ damage (e.g. retinopathy, nephropathy).
  - **Lifestyle advice:** offer lifestyle advice at initial diagnosis and review periodically during follow-up visits.

  Remember:
  - B-Blockers not recommended as first-line treatment.
  - Don't add thiazide diuretics with B-blockers to reduce risk of developing DM.
  - Prefer chlorthalidone and indapamide over bendroflumethiazide or hydrochlorothiazide if a thiazide-like diuretic is being started.
- **Target BP:**
  - **<80 years:** <140/90 mmHg (or <135/85 on home BP monitor)
  - **>80 years:** <150/90 (or <145/85 on home BP monitor).
  - **DM without proteinuria:** 130/80 mmHg
  - **DM with proteinuria:** 125/75 mmHg

4. Back pain

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Jamila Khatoon, 60 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and, will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This elderly lady has 02 months history of mid-thoracic backache. Her pain has not much responded to co-codamol.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of backache

- **Site of pain:** *"Where exactly the pain is? ... Can you point it?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull? ...... Is it a constant, pain or it comes and goes?"*
- **Radiation:** *"Does it move circumferentially along the ribs to the front or legs?"*
- **Associations (D/D)—**
  - ***Vertebral body collapse / compression:*** *"Do you have any trauma to the back, history of fall or lifting a heavy weight?"*

  If radicular pain think of
    - Intervertebral disc herniation
    - Cord compression
    - Spinal stenosis
  - ***Multiple myeloma or Metastatic bone disease** (from lungs or breast, Ca prostate):* *"Do you have any fever, weight loss; cough or any phlegm with blood; any problem with your bowel or water works?"*
  - ***Seronegative spondyloarthropathy:*** *"Do you have any stiffness in lower back and pain in your other joints?"*
  - ***Brucellosis, septic arthritis***
  - ***Osteoporosis:*** Early menopause, oophorectomy, smoking, nutrition deficiency, corticosteroids, smoking, lack of exercise. Do ask about HRT.
- **Timings/duration:** *"Since how long you have the pain?"*
- **Exacerbating & relieving factors:** *"What makes it better? ..... What makes it worse?"* Worse on coughing, sneezing and twisting or movements. Relieves with medicines.
- **Severity:** *"How bad it is on a scale of 1-10? ...... How badly it is affecting your life including work and sleep?"*

▶ INVESTIGATIONS (EXPLAIN TO THE PATIENT)

- **Bone profile:** (Serum Ca+2, PO4, alkaline phosphatase, Vitamin D3 levels)
- **Thoracic & lumbar spine X-rays**
- **MRI thoracic & lumbar spine:** for intervertebral disc disease

- **CBC**
- **LFTs**
- **Serum immunoglobulins**
- **Dual energy X-ray absorptiometry (DEXA) scan**

T-score	
Normal	Bone density within 1 SD (+1 or −1) of the young adult mean
Low bone mass	Bone density between 1 and 2.5 SD below the young adult mean (−1 to −2.5 SD)
Osteoporosis	Bone density 2.5 SD or more below the young adult mean (−2.5 SD or lower)

  - **Fracture Risk Assessment Tool (FRAX):** give the probability of osteoporosis related fracture in next 10 years using the femoral neck BMD and other clinical risk factors.
- **Isotope bone scan:** for fractures and metastatic deposits

▶ MANAGEMENT

- **Risk factor reduction:** smoking cessation, stop corticosteroids, prevention of falls
- **Oestrogen replacement therapy:** 30% risk reduction of hip fracture, 30-50% of spine fracture.
- **Bisphosphonates + calcium and vitamin D supplementation first line treatment for osteoporosis**
- **Selective oestrogen receptor modulator:** Raloxifene
- **Recombinant parathyroid hormone**
- **RANK ligand antibodies:** denosumab
- **Calcitonin**

5. Breathlessness

Your role: You are the doctor in a respiratory clinic

Patient: Mr. Akbar Khan, aged 75

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 75-year-old ex-smoker with asthma for last 05 years presented with increasing breathlessness and wheeze. His peak flow is 150 L/min. He is using salbutamol and beclomethasone inhalers.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Detail of shortness of Breath

- **Duration:** *"Since how long you have shortness of breath?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better?"*
- **Associations (D/D):**
  - ***If cough, sputum & wheeze:*** *"Do you have intermittent or progressive shortness of breath with cough and wheeze? .... Do you have more breathlessness, wheeze and cough in the mornings; or there is no day to day variability? ..... Any allergy to common household allergens like pets, house dust mite, pollen and smoke?"*
    - **COPD:** Progressive symptoms without daily variation. Smoking history & age when started. Quantify by pack-years. Ask about number of exacerbations per year (increased breathlessness, increased sputum volume or purulent sputum), winter exacerbations, any worsening after coryzal illnesses.
    - **Asthma:** Intermittent symptoms with morning dipping, history of atopy/allergic rhinitis, eczema.
      - ***Allergic asthma:*** *"Any running nose or sneezing?"*
      - ***Occupational Asthma:*** *"Any exposure to isocyanates, platinum salts, hardening agents, soldering fluxes? Do you have symptoms while at work? Do they come on straight away or after a time lag during the day? What exactly is your job at work?* (desk job, transportation or dough preparation/baking, cleaning solvents at work, working with varnishes, paints, adhesives containing isocyanates) *How much exposure you get? Do the symptoms improve away from work like holidays?"*
    - **Others:** Bronchiectasis, pneumonia, pleural effusion, pneumothorax, pulmonary embolism, pulmonary hypertension, ILD
  - ***If no cough & sputum; wheeze (±):***
    - **Heart:** IHD, cardiomyopathy, valvular heart disease, pericardial disease
    - **Psychological**

TREATMENT HISTORY

- *"Do you have a peak flow meter at home? What is your reading at home?"*
- *"Are you using any inhalers? ... Which type of inhalers? (Multidose or turbohaler or accuhaler) ... How do you use them? ... How frequently you use salbutamol inhaler as rescue inhalation? ... Do you feel any embarrassment of using inhalers especially in public?"*
- *"Do you take any prednisolone tablets? ... Do you have any improvement with it?*
- *"Have you received any vaccination against influenza or pneumonia?"* (Influenza or pneumococcal)

COPD

Investigations

- CXR
- CBC
- ECG
- **Lung function tests:** Spirometry, lung volumes, flow volume loops, diffusion capacity, reversibility of FEV$_1$ to salbutamol
- O$_2$ saturation on air
- Serial peak flows

(arrange follow-up to discuss the results)

NICE COPD Guidelines (previous British Thoracic Guidelines on COPD were recently superseded)

- Airflow obstruction, which is usually not fully reversible on post-bronchodilator spirometry.
- FEV$_1$/FVC ratio < 0.7

Treatment

- **First-line treatment:** short-acting bronchodilator inhaler used as required
- **Second-line treatment:** If the patient still remains breathless or has exacerbations despite the above.
  - ***FEV$_1$ > 50% predicted:***
    - Long-acting B2-agonist inhaler (e.g., salmeterol) **OR**
    - Long-acting muscarinic antagonist inhaler (e.g., tiotropium).
  - ***FEV$_1$ <50% predicted:***
    - **Long-acting B2-agonist inhaler +**
      - Inhaled corticosteroid (combined preparations) or
      - long-acting muscarinic antagonist inhaler
  - ***If remain breathless on the above regardless of FEV$_1$:***
    - long-acting muscarinic antagonist inhaler **PLUS**
    - Combination inhaler (long-acting B2-agonist inhaler + inhaled corticosteroid)
- All patients with COPD should be advised to stop smoking and the necessary advice and support provided at every stage.

BODE Index for COPD survival prediction

VARIABLES	POINTS ON THE BODE INDEX			
	0	**1**	**2**	**3**
BMI	>21	≤21		
Airflow Obstruction FEV$_1$ (%predicted)	≥ 65	50-64	36-49	≤ 35
Medical Research Council Dyspnoea scale score (0-4)	0-1	2	3	4
Exercise tolerance - Distance walked in 6 min (m)	≥350	250-349	150-249	≤149

Approximate 4 Year Survival Interpretation:

0-2 Points:	80%
3-4 Points:	67%
5-6 Points:	57%
7-10 Points:	18%

Long term oxygen therapy (LTOT)

- Assess for LTOT in stable COPD patients already taking maximal treatment by taking ABGs twice at least three weeks apart.
- O_2 is given @ 2 - 4 L / min for at least 15h in a day. Short-burst oxygen therapy for breathlessness in the absence of any hypoxia is not recommended.

  INDICATIONS:
  - $PO_2 < 7.3$kPa (55 mmHg) or
  - PO_2 7.3 - 8.0 kPa (55 - 60 mmHg) and the presence of
    - Pulmonary hypertension
    - Secondary polycythaemia
    - Nocturnal hypoxia
    - Peripheral oedema (regardless of PCO_2 levels)

      (FEV1 < 30%, SaO2 <92% on room air, cyanosis, raised JVP)

  Hypercapnia is not a contraindication for LTOT, but the patient should be encouraged to remain on the prescribed flow rate.

Treatment of exacerbations

- Supplementary O_2 if necessary, to keep the SpO_2 within the individualized target range
- Nebulized bronchodilators
- Oral prednisolone 30 mg for 7-14 days
- Antibiotics in the presence of two or more of increased breathlessness, increased sputum volume or purulent sputum.

  INDICATIONS FOR ADMISSION
  - Unable to cope at home
  - Moderate breathlessness
  - Reduced consciousness
  - Cyanosis
  - Poor level of activity
  - Poor social circumstances

Asthma

(overlap of both conditions in some patients)

- **Bronchodilator reversibility:** FEV_1 improves by more than 400 mL (> 15 %) after bronchodilators or 30 mg prednisolone daily for 2 weeks
- **Morning dipping:** Serial peak flow measurements show $\geq$ 20% diurnal or day-to-day variability (morning dipping > 3 days per week for 2 weeks)

Treatment

Patients with stable asthma are treated according to the five-step guidelines (British Thoracic Society).

- **Step 1:** occasional use of relief bronchodilators
- **Step 2:** addition of a low-dose corticosteroid inhaler
- **Step 3:** addition of a long-acting B-agonist and/or increasing the dose of the corticosteroid inhaler
- **Step 4:** high-dose corticosteroid inhalers and consideration of other drugs like a leukotriene receptor antagonist or sustained-release theophylline
- **Step 5:** oral steroids.

More recently guidelines have been updated which can be consulted.

Checking inhaler technique

- **Technique for metered dose inhaler (MDI) use**
  - Remove the cap and shake the inhaler
  - Gently breathe out
  - Place the mouthpiece in the mouth (with the inhaler upright) while sealing it with the lips, press the canister down at the start of inspiration. Continue inhaling slowing and deeply
  - Hold the breath for 10 seconds and then breathe out
  - Take another inhalation after waiting about 30 seconds

  The other inhalers are turbohaler, autohaler and accuhaler.

  Do highlight the importance of chlorofluorocarbon (CFC) versus non-CFC inhalers.

6. Burning of the feet

Your role: You are the doctor in the diabetes clinic

Patient: Mr. Jamal Din, 55 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 55-year-old man with poorly controlled T2DM have burning pain in legs which stop him from sleeping. He recently has been found to have hypertension and dyslipidemias along with proteinuria.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Detail of burning in the feet

- **Duration:** *"Since how long you have this problem?"*
- **Progression:** *"Is it getting worse?"*
- **Severity:** *"Where exactly the burning pain is in your feet? ..... Up to which level (shins, calves)? ..... Do you have burning anywhere else like in your hands? .... What is your sleep quality?"*
- **Aggravating factors:** *"What makes it worse? ... Tight shoes/socks, walking. .... Is there a pressure effect from the bed clothes?"*
- **Relieving factors:** *"What makes you feel better? ...... Do you have to pull away the bed sheets to relieve the pain? ..... Any relief from simple analgesics?"*
- **Other symptoms**
  - ***Motor:*** *"Any muscle weakness, wasting?"*
  - ***Sensory:*** *"Any numbness or tingling .... Just like feeling of walking on cotton wool?"*
  - ***Balance or gait:*** *"Any problem with your balance especially when walking in the dark or when eyes closed?"*
  - ***Autonomic:*** *"Do you feel dizzy when you stand up quickly from sitting position?"*
- **Associations (D/D)** *Mnemonic - DAD RUMS*
  - ***DM:*** *Diabetic history; has control worsened or improved?*
  - ***Alcohol & vitamin B12 deficiency:*** Pernicious anemia due to autoimmune gastritis, malabsorption
  - ***Drugs:*** INH, nitrofurantoin, chemotherapy
  - **RA & SLE**
  - ***Uremia:*** CRF
  - ***Malignancy:*** carcinoma, multiple myeloma
  - ***Syphilis, HIV:*** infections

  - ***HMSN:*** family history
  - ***Peripheral vascular disease:*** *"Do you have any pain in your legs while walking (leg claudication)? ...... Smoking?"*
  - ***Spinal or nerve root problems:*** other neurological symptoms, any backache

▶ INVESTIGATIONS

- **NCS:** clinical diagnosis suffice in diabetic neuropathy.
- **HbA1c**
- **Vitamin B12 levels, anti-parietal cell antibodies, anti-intrinsic factor antibodies**
- **RFT's**
- **Malignancy / Myeloma screening**
- **Syphilis screening:** VDRL, TPHA

▶ TREATMENT

- **Improve glycaemic control**
- **Pain control:**
    - Simple analgesia
    - ***Serotonin and noradrenaline reuptake inhibitors:*** duloxetine
    - ***Anticonvulsants:*** Pregabalin or gabapentin
    - ***Tricyclic antidepressants:*** Amitriptyline, imipramine (Used in the past but not preferred now because of side-effects)
    - ***Referral to the pain management team:*** For transcutaneous electrical nerve stimulation (TENS), lignocaine or mexiletine injections or spinal stimulation
- **BP management** (Targets for BP control)
    - ***DM uncomplicated:*** < 140/90
    - ***DM with proteinuria:*** <130/75
- **Cholesterol:** Do not treat in isolation but as part of cardiovascular event prevention. Previously, a risk of MI above 30% over 10 years would have been set as a target: however, as the cost of statins falls, this target is expected to reduce to 20% or even 15%.

Discussion

Diabetic neuropathies

- **Diabetic painful neuropathy (DPN):** burning sensation, worse at night, aggravates and become extremely intolerable due to pressure from bedclothes. Good long-term glycaemic control is essential for management but in some patients, neuropathy is resistant to therapy.
- **Symmetrical sensory polyneuropathy:** loss of vibration and temperature sensation resulting in
    - Foot ulcers from ill-fitting footwear by unrecognized trauma
    - Charcot's joints (neuropathic arthropathy)
- **Diabetic amyotrophy:** asymmetrical wasting of quadriceps
- **Autonomic neuropathy**
- **Mononeuritis multiplex**

7. Chest pain

Your role: You are the doctor in a cardiology clinic

Patient: Mr. Basharat Ali, 60 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 60-year-old man, known to have IHD and angioplasty 3 years ago, presented with 04 months history of burning chest pain occurring both at rest and exertion, without any relief with nitrates.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of chest pain

- **Site:** *"Where exactly the chest pain is?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull?"*
- **Radiation:** *"Does it move anywhere else like your left arm, neck, jaw or back?"*
- **Association (D/D):**
  - ***IHD:*** *"Do you have chest pain at rest, or it appears on exertion? ... Does it stop after stopping exertion and returns on restarting? ... Does it appear on walking uphill or climbing stairs? ... How many meters can you walk on the flat before it appears?"*
  - ***Aortic dissection:*** *"Is it sudden onset severe tearing pain between your shoulder blades radiating to the neck or down to the back?"*
  - ***Musculoskeletal:*** *"Does it increase on pressing or movements?"*
  - ***Pleuritic:*** *"Does it worsen on taking deep breath in?"* ***(pulmonary embolism, pneumonia)***
  - ***Pericardial:*** *"Does it worsen on lying flat?"*
  - ***GERD:*** *"Any association with eating or hunger?"* ***(APD)***
  - ***Esophageal rupture:*** *"Did you have any recurrent vomiting before you developed chest pain?"*
  - ***Post herpetic neuralgia:*** *"Do you have any painful rash with clusters of blisters over your chest?"*
  - ***Spinal mass or disc herniation:*** *"Does it worsen on coughing or sneezing?"*
- **Timings:** *"Since how long you have the chest pain? ...Is it constant, or comes and goes?"*
- **Exacerbating /alleviating factors:** *"What makes it better? ..... What makes it worse?" Does it aggravate on exertion or breathing or movements and relieve with rest?"*
- **Severity:** *"How bad is the pain on a scale of 1-10?"*

▶ INVESTIGATIONS

- FBC, U&E, lipid profile, resting ECG, CXR
- **With low probability of cardiac cause**
  - Exercise ECG
  - Stress myocardial perfusion scan

  If negative, put the patient on a trial of a proton pump inhibitor.

- **With high probability of cardiac ischaemia**
  - Coronary angiography

Discussion

GERD

Investigations

- Upper GI endoscopy
- 24-h intraluminal oesophageal pH monitoring

Treatment

- Pharmacological versus non-pharmacological

8. Cold and painful fingers

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Bushra Zaman, 50 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 50-year-old smoker lady with cold and painful fingers for last 01 year. Apart from winter bronchitis last year, she does not have any significant past medical history.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of cold and painful fingers

- *"In which fingers you have the problem? ... Does it affect whole or part of your fingers? ... From which finger it starts first? ... Are the thumbs spared? ... Any other part of body affected like toes, earlobes or tip of nose?"*
- *"Any colour changes like white, blue or red?"*
- *"Whether the fingers are normal between attacks?"*
- *"Do you have any pain, numbness or burning in your fingers"*

Raynaud phenomenon typically starts from a single finger followed by symmetrically spreading to other fingers in both hands. The most frequently involved fingers are index, middle, and ring fingers, often sparing the thumb entirely. Thumb involvement indicates underlying connective tissue disease.

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it getting worse?"*
- **Severity:** *"How often you have the attacks?"*
- **Aggravating factors:** *"What makes it worse? .... Are the attacks more frequent during winter?"*
- **Relieving factors:** *"What makes it better? .... Whether wearing gloves helps?"*
- **Association (D/D):**
  - ***Primary (Raynaud's disease):*** *"Do you have family history of similar disease?"*
  - ***Secondary in connective tissue diseases:*** RA, SLE, scleroderma, dermatomyositis, MCTD
    - *"Do you have Joints pain, joints swelling, rashes, difficulty in swallowing, bringing up of food (dysphagia/reflux), shortness of breath, or dry cough?"*
  - ***Chill blains***
  - ***Hyperviscosity states:*** Cryoglobulinaemia (hepatitis B & C), myeloproliferative disorders, Waldenstrom's macroglobulinaemia
    - *"Any yellowness of your eyes?"*
  - ***Peripheral vascular disease:***
    - *"Any pain in legs on walking?" (claudication)*
    - *"Do you smoke?"*
  - ***Neurological disease:*** syringomyelia, cervical rib, cervical myelopathy, carpal tunnel syndrome

  - *"Do you have any problem with movement of neck like stiffness"*
  - *"Any injury to the neck area before developing these symptoms?"*
  - *"Any numbness or tingling in your hands?"*
- ***Vibrating tools:*** job, precipitating factors at work
- ***Drug induced:*** B-blockers, chemotherapy drugs (bleomycin, vinblastine and cisplatin)
- **Hypothyroidism:**
  - *"Any problem adjusting to temperatures?"*
- ***Cocaine***

▶ INVESTIGATIONS

- Find the cause if secondary, but no specific investigations if primary disease; angiography of the digits is not indicated.

▶ MANAGEMENT

- **Address concerns:** regarding loss of any finger.
- **Reassure:** in idiopathic cases, it is rare to have loss of fingertips and amputation due to gangrene.
- **Smoking cessation**
- **Advise to Keep the hands warm**
- **Nifedipine 10mg TDS**

9. Collapse? Cause

Your role: You are the doctor in a general medical clinic

Patient: Mr. Junaid Shamsi, 50 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 50-year-old man with T2DM maintained on insulin had post-meal 03 minutes of unconsciousness and jerky movements without low blood sugars.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of collapse

- *"Can you please tell me what happened exactly? .... What were you doing at that time? ..... Did you remember while falling?"*

If the patient was sitting down at the moment of the collapse, this would point away from a vasovagal cause.

- **Events before collapse (Aura):**
  - *"Do you have any unusual symptoms before this like...?"*
    - *"Light headedness with visual blurring, nausea, sweating before collapsing?" (Presyncope with autonomic features)*
    - *"Chest pain or racing of heart?" (dysrhythmia)*
    - *"Seeing of unusual objects, abnormal smell, ringing in the ears?" (seizures)*
    - *"Sudden onset severe headache?" (subarachnoid haemorrhage)*
- **During the event:**
  - *"Was there anyone around you? ... What did they tell? ... Did you injure yourself? "*
  - *"Did you lose consciousness? .... Was it complete or incomplete? .... For about how long you remained unconscious?"*
  - *"Any shaking of your hands or face? .... Which limbs .... Which part of your face .... Where did the jerking movements start and where did they spread?"*
  - *"Did anyone tell you about any color changes of your skin?" (white, blue, grey)*
- **Post recovery events:**
  - *"Did you regain consciousness gradually? ... When you woke up, were you fully back to normal or there was any confusion or sleepiness? .... Did you wet yourself? ..... Did you bite your tongue? .... Any body aches or headaches? **(seizures)***
  - *"Any problem with speech or weakness in body limbs" **(TIA or stroke)***
  - *"Did anyone check your blood sugar level at that time?" **(hypoglycaemia)***

Take a detail history of the diabetes, especially the insulin treatment, any previous hypoglycaemic episodes and their characteristics

- **Ever had it before:** *"Do you have any previous similar episodes?"*
- **Associations:**
  - Hypoglycaemia

  - Vasovagal
  - Seizure
  - TIA
  - Cardiac dysrhythmia
  - Alcohol-related collapse
  - Intracranial lesion

INVESTIGATIONS

- FBC, U&E, LFT, GGT, Ca^{+2}, HbA_1C, BSR
- CXR
- ECG, 24-h ECG recording, echocardiogram
- EEG
- CT scan / MRI brain

10. Chronic confusion (forgetfulness)

Your role: You are the doctor in an elderly clinic

Patient: Mr. Ghulam Jaffar, aged 80 years

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 80-year-old man having CVA 07 years ago have progressively worsening confusion and forgetfulness over the last one year.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of confusion and forgetfulness

Does the patient know about the problem? **(Insight)**

- **Duration:** *"How long ago the symptoms were first noticed"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse? ... How these symptoms have progressed ... gradually or with sudden, worsening episodes?"*
- **Severity:** *"What does he forget about? ...."*
  - *"Does he forget what day or time it is?"*
  - *"Does he forget where he is?"*
  - *"Does he lose his way to his home?"*
  - *"Does he forget the name of his family members?"*
  - *"Any problem recalling present or past event?"*
  - *"What about his personal hygiene?"*
  - *"Any problem in his mood or behavior?"*
  - *"Does he see the objects which other don't see?"*
- **Associations (D/D):**
  - ***Alzheimer's disease***
  - ***Lewy body dementia:*** Visual hallucinations, fluctuations in awareness from day to day, dementia within one year of disease onset
  - ***Pick's disease (frontotemporal dementia):*** antisocial behavioral changes
  - ***Progressive supra nuclear palsy:*** vertical gaze palsy with inability to look down
  - ***Parkinson's disease related dementia:*** Tremors develops after many years of PD, abnormal gait
  - ***Vascular dementia (multi-infarct dementia):*** stepwise progression with periods of sudden decline with neurological symptoms and then stability, DM, HTN
  - ***Normal pressure hydrocephalus***
  - ***Vitamin B12 deficiency:*** *peripheral* neuropathy
  - ***Toxic (alcohol):*** decreased consciousness, ataxia, diplopia
  - ***Hypothyroidism***
  - ***Creutzfeldt-Jakob disease***

  - ***Post-head trauma***
  - ***Seizures***
- **Social history with risk assessment:** e.g. boiling water, cooking (gas), heating
- **Referral to memory clinic**

▶ INVESTIGATIONS

- **Psychometric testing**
- **Dementia screening:**
  - FBC, RFTs, LFTs, glucose, calcium,
  - B12 levels
  - Free T4 & TSH
  - Syphilis serology
  - CT scan / MRI brain
- **Cognitive test**
  - Mini-Mental State Examination (MMSE) **OR**
  - The General Practitioner Assessment of Cognition Score (GPCOG)

▶ TREATMENT OF ALZHEIMER'S DISEASE

- **Acetylcholinesterase inhibitors:** Donepezil, rivastigmine and galantamine
- **NMDA receptor antagonist:** Memantine. Used in moderate or severe Alzheimer's disease when patients are not able to take an acetylcholinesterase inhibitor

11. Cough

Your role: You are the doctor in a chest clinic

Patient: Mrs. Iram Faheem, 40 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 40-year-old lady presented with 09 months history of cough more marked at night while sleeping with occasional phlegm and occasional heart burns but no wheezing or breathlessness.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough

- **Duration:** *"Since how long you have the cough?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is?"*
- **Associations:** Sputum, haemoptysis, dyspnoea, orthopnoea, wheeze, fever and heartburn, any recent renovation at home

  Differential diagnosis

Dry | Wet

⇙ ⇘

- ILD
- Drugs (ACEI, amiodarone)

Fever

↗ **Yes**
- **TB/pneumonia/bronchiectasis** (contact history for TB)

↘ **No**
- **Asthma** (morning cough; allergic history to common house-hold allergens, e.g. cats, dogs, pollen, house dust mite, mould; occupational history)
- **Chronic bronchitis** (smoking history)
- **GERD** (night-time cough with heartburns)
- **Postnasal drip**
- Allergic rhinitis
- Sinusitis

- **Impact of the cough on the patient & family:** like poor sleep pattern and urinary incontinence

▶ INVESTIGATIONS

- **CXR**
- **X-ray PNS / CT scan sinuses**
- **Serial peak flow monitoring:** monitor diurnal variation suggestive of asthma
- **24-h intraluminal oesophageal pH monitoring:** to rule out GERD
- **Bronchoscopy**

12. Diabetic foot

Your role: You are the doctor in a diabetic clinic

Patient: Mr. Gohar Mehboob, 65 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 65-year-old man having long standing diabetes with sensory neuropathy is now on insulin. He has developed ulcer over left 4th toe with blackening. Pulses are absent in left foot.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

HISTORY (CHIEF COMPLAINTS)

Details of foot lesion

- *"Can you please tell me what exactly the problem is?"* **(Ulcer, gangrene, Charcot joint)**
- *"Where is the problem?"* **(Site)**

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"How did it develop?"*
- **Progression:** *"Is it getting worse over time?"*

Detailed history of the diabetes

- **Microvascular complications:**
  - *"Do you have any numbness or burning sensation in your hands or feet?"* ***(Neuropathy)***
  - *"Any visual problems?"* ***(Retinopathy)***
  - *"Any frothing in your water works?"* ***(Nephropathy)***
- **Macrovascular complications:**
  - *"Any history of heart attacks or exertional chest pain?"* ***(CAD)***
  - *"Any pain in your legs on walking?"* ***(Peripheral vascular disease)***
- **Autonomic complications:**
  - *"Any early satiety?"* ***(Gastroparesis)***
  - *"Any light headedness on suddenly standing or dry feet?"* ***(Postural hypotension)***
  - *"Do you have any problem in maintaining sexual relations?"* ***(Erectile dysfunction)***
- **Balance:**
  - *"Any problem with your balance?"*
- **Motor:**
  - *"Do you have any difficulty in rising from chair?"*

TREATMENT HISTORY

- Oral hypoglycemics or insulin / diabetic diet

RISK ASSESSMENT

- Hypertension, cholesterol, family history of CAD,
- Smoking, alcohol

Discussion

25% of diabetics have foot ulcers during their lifetime. Risk of amputation with diabetic foot ulcer is 14-24%. Risk of amputation increases if diabetes present for >10 years, peripheral neuropathy, peripheral vascular disease, structural foot abnormality (callus, thickened nails, bony abnormalities), smoking, and a past history of ulcer or amputation. Risk of ulcer is increased by 1.6% while risk of amputation by 1.5 times with each 2% increase in the HbA_1c.

Differentiation between ischaemic and neuropathic ulcers: Both may coexist.

- **Ischaemia ulcers:**
  - Resting pain, claudication
  - Cold feet, poor pulses, painful (especially heels, ankles and toes)
- ***Neuropathic ulcers:***
  - Warm feet, bounding pulses, painless

Management

- **General**
  - Avoid smoking
  - Reduce alcohol intake
  - Pressure-relieving mattress
  - Restrict activity and provide temporary footwear
- **Specific measures**

  Patient should be managed in multi-disciplinary clinic (MDC) having diabetologist, physicians, dietitian, physical trainer, joint specialist, foot specialist & vascular surgeon.

  Inpatient or outpatient treatment depends on the extent of the ulceration/gangrene
  - ***Urgent vascular surgeon and diabetologist assessment***
    - Urgent angiography to determine the need for angioplasty versus local treatment.
  - ***Admission into multidisciplinary foot clinic for***
    - Angioplasty or bypass.
    - IV antibiotics
  - ***Control of BP, blood glucose and Fat levels***

    Explain the importance of good BP & glycaemic control as well as diabetic complications from poor control.
  - **Subcutaneous low molecular weight heparin**
  - ***Amputation*** (if the arterial supply can be improved, it may dry up and auto-amputate)

Patient education to avoid diabetic foot

- Select footwear carefully
- Inspect feet daily for early detection of signs
- Maintain foot hygiene daily to keep the skin moist and clean
- Avoid self-treatment for foot abnormalities
- Avoid high-risk behaviour (like. walking barefoot)
- Consult promptly if any abnormality

13. Difficulty in walking

Your role: You are the doctor in neurology clinic

Patient: Mrs. Shumaila Jabeen, aged 65

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 65-year-old smoker woman with chronic bronchitis have progressively worsening difficulty in walking for last 5 months with numbness in the feet progressing up to middle chest associated with central chest pain with band like radiation bilaterally.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness in the legs

"What actually the problem is?"

- *"Do you have weakness in one or both legs?"* **(One or both legs)**
- *"Do you have difficulty in walking up stairs and getting out of chair or weakness in the feet or global weakness?"* **(Proximal / Distal /Global weakness)**
- *"Are the legs stiff or floppy?"*
- *"Do you have weakness in any other part?"*
- *"Do you have any other problem with legs like numbness or tingling? ... Any problem with the balance?"*

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *""How did it start? ... Did it start abruptly or gradually?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How severe is the weakness?"*
- **Aggravating / relieving factors:** *"What makes it worse? ... What make you feel better?"*
- **Associations (D/D):** (Also ask other questions of CNS)
  - ***Spinal injury***
  - ***Respiratory, abdominal or gynecological neoplasm:***
    - *"Do you have any cough or chest pain? ... Any tummy pain or bowel problems? ... Any vaginal bleeding?"*
    - *"Do you have any backache or band-like chest pain worse on coughing, sneezing and straining?" (Suggest a level of spinal cord compression)*
  - ***Pott's disease:*** *"Do you have any swelling over the backbone or fever?"*
  - ***Hereditary spastic paraparesis:*** *"Any family history of leg weakness?"*
  - ***Myasthenia gravis:*** *"Is the weakness worse towards the end of the day?"*

Discussion

D/D of spastic paraparesis

- **Neoplastic spinal cord compression**
  - *Extradural (outside the dura):* lungs and breast

    Radicular pain at the site of the compression (thoracic band-like pain) worse on coughing, straining and sneezing; spastic paraparesis; and sensory loss up to the level of the compression
  - *Extramedullary (outside the spinal cord):* meningioma, neurofibroma and ependydoma
  - *Intramedullary (within the spinal cord):* glioma
- **Vertebral disc protrusion:** especially in the cervical spine
- **Inflammatory causes:** Tuberculous, epidural abscess

D/D of flaccid paraparesis

- **Proximal pattern:**
  - *NMJ problems:* MG, LEMS
  - *Myopathies:* polymyositis, dermatomyositis, PMR
  - *Muscular dystrophies*
  - *Endocrine:* Hyper/hypothyroidism, Cushing's syndrome, acromegaly
  - *Osteomalacia*
  - *Drugs:* statins, steroids, alcohol
- **Distal pattern:**
  - *Peripheral motor neuropathy:* GBS, CIDP, lead poisoning, acute Intermittent porphyria, diphtheria
  - *Myotonica dytrophica*
  - *Inclusion body myositis*
  - *HMSN*
- **Generalized** (Acute events):
  - Cord Compression
  - Transverse Myelitis
  - Infarction of the cord
  - Hypokalemic / Hyperkalemic periodic paralysis
  - MND
  - *Others:* Organophosphorus poisoning, snake bite
- **Asymmetrical:**
  - Polio
  - Radiculopathy
  - Plexopathy
  - Mononeuropathy

14. Dizziness or feeling faint

Your role: You are the doctor in a care of elderly clinic

Patient: Mrs. Sabira Parveen, aged 80

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 80-year-old hypertensive lady presented with several dizziness episodes and feeling faint during the last couple of months with left sided carotid bruit.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of dizziness

- *"Can you please tell me what exactly the problem is? ....."*

- **"Do you have any problem with your Balance?" (Vertigo):** *"Do you feel yourself spinning in the space or the things spinning around you along with nausea and vomiting?"*
  - *"Do you have any buzzing or ringing in your ears?"* ***(ear problem)***
  - *"Do you have any difficulty in speech or swallowing? ... Any weakness or numbness in any side of the body? ... Any double vision?"* ***(Posterior circulation stroke)***
- **"Do you have any loss of consciousness & muscle strength?" (Syncope):** *"Was it compete? ... For how long you remained unconscious? ... Did you recover spontaneously? .... Any unusual symptoms before you collapsed like nausea, sweating or turning pale? .... What triggers the loss of consciousness or dizzy spells?"* (In Presyncope consciousness and muscle strength not completely lost)
  - ***Vasovagal or neuro-cardiogenic syncope:***
    - *"Do you get such symptoms during specific situations like while passing water, coughing or sneezing?"* ***(Situational syncope)***
    - *"Do you get such symptoms when you suddenly turn your neck?"* **(Carotid sinus Hypersensitivity)**
  - ***Postural syncope:*** Drug history (antihypertensive, diuretics)
    - *"Do you have any problem when you suddenly stand up from sitting position?"*
  - ***Cardiac dysrhythmias:***
    - *"Do you have any racing of your heart when you feel dizzy"*
- **"Any shaking of limbs during loss of consciousness?" (epilepsy)**
  - *"Do you have any shaking of limbs during unconsciousness?*

- **Severity:**
  - *"How often you have the symptoms?"*
  - *"Do you have any fall as a result of dizziness? Did you have any injury due to fall?*
- **Red flag symptoms of syncope:** Exertional syncope, chest pain, dyspnoea, palpitations; headache, focal neurology, diplopia, dysarthria, ataxia.

▶ INVESTIGATIONS

- **Routine tests:** look for anaemia and electrolyte disturbance.
- **ECG**
- **24-h ECG tape**
- **Sitting and standing BP**
- **Carotid Doppler ultrasound**
- **Tilt table test:** Useful if postural hypotension due to impaired autonomic reflexes particularly in the elderly.

15. Double vision

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Najma Begum, 50 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This lady presented with double vision and difficulty in keeping the eyes open in the evening over many months.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of double vision

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"How it was first noticed? .... Was it sudden or gradual onset?"*
- **Progression:** *"Is it worsening over time?"*
- **Severity:** *"Which direction you can't read the print?"*
- **Aggravating factors:** *"Which part of the day you can read the print and when it worsens?"*
- **Relieving factors:** *"Does it improve after closing of one eye?"* **(MS, nerve involvement)**

Details of difficulty in keeping the eyes open (ptosis)

- **Duration:** *"Since how long you have this problem?"*
- **Progression:** *"Is it worsening since then?"*
- **Severity:** *"Is it in one or both of your eyes? Are you completely unable to open it or it is incomplete?"*
- **Aggravating factors:** *"Is it worse after looking upwards for a prolonged time?"*
- **Relieving factors:** *"What makes it better?"*
- **Associations (D/D):**
  - **Myasthenia Gravis:**
    - *"Is the weakness more pronounced after repeated activity and improves after rest?"* ***(Fatigability)***
    - *"Is the weakness worst at the end of day and does it improve after taking rest or sleep?*
    - *"Do you have weakness in walking up stairs and getting out of chair without using her arms?"* ***(Proximal muscle groups)***
    - *"Do you have weakness anywhere else, like? ..."*
      - *"Difficulty in chewing, swallowing or speaking?"* **(dysarthria at the end of sentences -- Bulbar involvement)**
      - *"Weakness of muscles of face?"* **(Myasthenic 'snarl' when attempting to smile)**
      - *"Any difficulty in breathing?"* **(Respiratory muscle weakness)**

        Do ask about other autoimmune disorders, e.g. hyperthyroidism, thyroiditis, SLE, rheumatoid disease and pernicious anaemia
  - ***Drug-induced myasthenia:*** anesthetic agent, aminoglycoside, penicillamine, phenytoin, procainamide
  - ***Lambert-Eaton myasthenic syndrome (LEMS):*** due to small cell lung cancer. Ask for other systemic symptoms.

- ***SOL brain (sphenoid ridge meningioma):*** 6th nerve palsy due to raised intracranial pressure. Features include headache, projectile vomiting, and focal neurological signs.
- ***Idiopathic intracranial hypertension***
- ***Miller Fischer variant:*** Preceding flu-like illness
- ***Botulism:*** *"Did you use any cane food before it developed?"*
- ***Mitochondrial disorders:*** Progressive external ophthalmoplegia.

▶ INVESTIGATIONS

- ***Anti-acetylcholine receptor (AChR)*** **antibodies*:***
  - Generalized myasthenia gravis --- positive in 90%
  - Ocular myasthenia --- positive in 50%
  - In remission --- positive in 25%

A negative result does not exclude myasthenia and patients with pure ocular myasthenia are more likely to be seronegative.

- **Anti-muscle-specific tyrosine kinase (MUSK) antibodies**
  - Generalized myasthenia --- positive in 40 - 50% AChR antibody negative patients
- **Tensilon test:** Give edrophonium chloride 2 mg IV test dose, then 8 mg IV (acetylcholinesterase inhibitor) and look for immediate improvement in weakness.
- **Repetitive nerve stimulation:** 15% decrement of muscle-evoked action potential at 3 Hz.
- **Ice pack test:** a simple bedside test with a sensitivity around 80%. Performed by placing an ice pack on a closed eyelid for 2 min. An improvement of the ptosis constitutes a positive result. (Neuromuscular transmission improves at lower temperatures)

▶ TREATMENT

- Oral pyridostigmine
- Steroids/other immunosuppressive drugs
- Thymectomy
- **Myasthenic crises:**
  - Plasmapheresis/IV immunoglobulin

16. Dysphagia

Your role: You are the doctor in a gastroenterology clinic

Patient: Mr. Fareed Ali, 68 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management

Referral text / Clinical problem:

This elderly male with long-standing heartburns have difficulty in swallowing and weight loss for last few months.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of swallowing difficulty

"Would you to tell me what exactly the problem is?"

- *"Do you have painful swallowing or difficulty in swallowing?"* **(odynophagia vs dysphagia)**
- *"Do you have a difficulty in initiating swallowing with coughing, choking or nasal regurgitation?"* stroke, MND, MG, Globus hysterics **(Neurological disorder)**
- *"Do you feel sticking of food in your food pipe? ... Can you point to where food seems to stick?"* compression web, pharyngeal pouch, thyroid swelling **(High dysphagia)**
- *"Is it only for solids?"* **(obstructive)** Ask about **ALARM Symptoms**: **A**naemia, **L**oss of weight, **A**norexia, **R**ecent onset of progressive symptoms, **M**alena/hematemesis, **S**wallowing difficulty)
- *"Or both for liquid and solids?"* **(motility disorder)**
  - *"Are you throwing food effortlessly?"* **Achalasia**
  - *"Is it intermittent with chest pain?"* **DES**
  - *"Do you have any skin changes or whitening of fingers on exposure to cold"* **Scleroderma**

- **Duration:** *"Since how long you have difficulty in swallowing?"*
- **Progression:** *"Is it getting worse?"*
- **Association (D/D):**
  - ***Esophagitis:***
    - Reflux oesophagitis
    - Drug-induced oesophagitis: NSAIDs, aspirin, potassium
    - Infective oesophagitis: candida, herpes, cytomegalovirus
  - ***Neuromuscular disorders:*** bulbar palsy
  - ***Benign esophageal stricture***
  - ***Esophageal tumor:*** carcinoma, benign such as leiomyoma
  - ***Motility disorder:*** achalasia, DES, scleroderma
  - ***Pharyngeal disorder:*** Pharyngeal pouch or web
  - ***Globus hystericus:*** High dysphagia in the throat related to anxiety
  - ***Foreign body obstruction:*** any history of a foreign body ingestion

Details of heartburns

- **Duration:** *"Since how long you have heartburns?"*

- **Progression:** *"Is it getting progressively worse?*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better?"*

INVESTIGATIONS

- ***Routine blood tests:*** look for malnutrition and anaemia
- ***CXR:*** look for signs of pulmonary aspiration
- Barium swallow
- Upper GI endoscopy

17. Epigastric pain and nausea

Your role: You are the doctor in a gastroenterology clinic

Patient: Mrs. Seema Tanveer, 40 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This young lady has intermittent epigastric pain and nausea for last couple of months.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of epigastric pain

- **Site:** *"Where exactly the pain is?"*
- **Onset:** *"How did it develop? ..... Suddenly or gradually?*
- **Character:** *"What type of pain it is? .... sharp, stabbing, or burning?"*
- **Radiation:** *"Does it move to the back or to the shoulder?"*
- **Association (D/D):** *"Do you have any problem of heart burns or indigestion? ... Any problem with swallowing? ... Any tummy pain? ... How has the appetite been? ... Have you lost weight during recent months and you are not trying to diet recently? ... How are your bowel habits?"* Ask about vomiting, hematemesis, rectal bleeding, jaundice, pale stools, and dark urine.
    - ***Drug induced gastritis:*** NSAIDS, aspirin
    - ***Non-specific dyspepsia***
    - ***Peptic ulcer disease***
    - ***Gallstones***
    - ***GI neoplasia***
- **Timings:** *"Since how long you have tummy pain? ...Is it constant, or comes and goes?" When you have the pain ... empty stomach or after meals or at mid night?"*
- **Exacerbating / relieving factors:** *""What makes it worse? ... Does it worsen on movement, taking meals or breathing? ...... What makes it better? ... Does it relieve with food, belching, antacids, defaecation?"*
- **Severity:** *"How bad is the pain on a scale of 1 - 10?"*

Details of nausea

- *"At what time you feel nausea. Is it associated with pain in your tummy"*

▶ INVESTIGATIONS

ALARM Symptoms />55years

⇙ ⇘

Yes **No**

⇓ ⇓

Upper GI endoscopy

***PPI**
for 01 month

⇓

H pylori testing

⇙ ⇘

Negative

⇓

PPI/H2 blockers
for 01 months

⇓

No improvement
Long term low dose anti secretory
Treatment ± endoscopy

Positive

⇓

Eradication

⇓

Urea breath test
at 02 months

⇓

Negative
but no improvement

⇓

Upper GI endoscopy

*H. Pylori screening can also be done in the beginning as there is no strong evidence as to which to do first. For a reliable urea breath test, the patient must be off from PPI for 2-weeks before the test as wash-out period. Non-invasive tests for H. pylori include urease breath test and measuring IgG antibodies in serum.

18. Facial swelling

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Sobia Naz, 30 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This young lady presented with recurrent episodes of itchy facial swelling without any apparent cause.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of facial swelling and weals on hands

"Can you please tell me what exactly the problem is?"

- *"Where exactly you have the problem?"* **(Site)**
- *"Do you have swelling around your lips, eyes or on your face; or weals or itching on your face or hands?"* **(Description)**
- *"Do you have any stridor or shortness of breath? ... Any tummy pain, or fever, joint and muscles pain?"* (Laryngeal oedema / gastrointestinal / systemic symptoms) *"Is it associated with any wheezing in the chest or collapse?"* **(Associated symptoms)**

- **Duration:** *"Since how long you have this problem?"*
- **Onset:** *"How quickly it appears and for how long it persists?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How often it appears?"*
- **Precipitating factors:** *"What triggers the attack?"*
  - Trauma, deep pressure, emotional stress, extreme cold or heat, solar rays, insect bites, inhalatory allergen (pollen, animal dander, mold), allergic contact substances (metallic jewelry or dog/cat hair and saliva)
  - ***Food allergies:*** Fruit (strawberries), food coloring, shellfish, chocolate, peanuts
  - ***Drugs:*** NSAIDs, aspirin, ACE inhibitors, opiates and penicillin
- **Relieving factors:** *"What makes you feel better?" antihistamines and prednisolone*
- **Association (D/D):**
  - ***Urticaria:*** *"Any past history of atopy, eczema, allergic rhinitis, asthma; lymphoma?"*
  - ***Angioedema:*** *Any family history of similar attacks?"*

▶ MANAGEMENT

- **Reassure the family about**
  - Commonly there is no obvious cause for the urticaria and angioedema, so routine investigations are not required.
  - Most idiopathic cases may last for a few months before resolving altogether but some people go on to have chronic urticaria with recurrent episodes.

  - Symptoms are rarely severe and dangerous, and one should know that what to do if laryngeal swelling occurs.
- **Avoid aspirin and opiates:** can cause degranulation of mast cells
- **Avoid precipitating cause of urticaria:** such as cold, deep pressure, heat and stress.
- **Regular prophylactic non-sedating antihistamines:** Cetirizine 10 mg OD or loratadine 10mg OD

Discussion

- **Urticaria:** a well-circumscribed erythematous weals
- **Angioedema:** a localized oedema involving subcutaneous or submucosal tissues

Angioedema

⇙ ⇘

Mast cell mediated	Bradykinin mediated
• Urticaria, pruritus, bronchospasm, anaphylaxis	• No urticaria, pruritus, bronchospasm, anaphylaxis (vasodilation & increased vascular permeability causes soft tissue swelling)
• Food products • Insect stings • Drugs: antibiotics or NSAIDs	• Hereditary angioedema caused by C1 inhibitor deficiency • Drugs: ACEI

Remember:

- Important: EpiPen for self-use in case of acute severe attack. Severe attack with laryngeal swelling (stridor) will need urgent admission to casualty for emergency treatment and observation.

19. Funny turns

Your role: You are the doctor in a diabetes clinic

Patient: Mr. Daman Din, 67 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This elderly diabetic maintained on insulin with history of CABG surgery last year, and under investigations for leg claudication, have episodes of altered consciousness towards noon before lunch.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of funny turns

- **Duration:** *"Since how long you have the problem?"*
- **Severity:** *"How often it occurs?"*
- **Association:** *"Can you please tell me a little bit more detail about the nature of these 'funny turns?"*
  - ***Hypoglycaemia:*** *"Do you have any sweating, palpitations, hunger, blurred vision, light-headedness? ... At what time of the day you have the symptoms like before lunch or late midnight? ... Are you aware of these symptoms each time?* **(Hypoglycemic awareness, ask about B-blocker use)** *... Have you ever tested your blood glucose during these episodes?"*
  - ***Stroke or TIA***
  - ***Dysrhythmia:*** *"Do you feel your heart racing or slowing down before you feel altered consciousness?"*
  - ***Postural hypotension / vasovagal syncope:*** *"Is it associated with posture or movement?"*
  - ***Epilepsy:*** *"Any shaking of limbs with altered consciousness?"*

Details to find the cause of hypoglycaemia

- **Tight glycaemic control:** *"Can you please let me about your home glucose monitoring record or recent HbA1c levels?"*
- **Faulty insulin regime or injection technique:**
  - *"What type of insulin you are taking? ... In which dose and how many times?"*
  - *"How do you administer insulin? ... Do you have any lump at injection site?"* ***(Ascertain any change in insulin absorption)***
- **Imbalance with the diet:** *"How many meals and snacks you have and at what times? ... What type of meal you have? ... Are you regular in your meal timings? ... At what time you take insulin injection?"*
- **Unusual activity:** *"What type of physical activity in routine you have? ... Do you have any change in your activity level?"*
- **Factitious:** Over dosage of insulin or oral hypoglycemics
- **Symptoms suggestive of other causes of hypoglycaemia:**
  - ***Endocrine:*** Hypopituitarism, Addison's disease
  - ***Tumors:*** Insulinoma, sarcomas, large mesenchymal tumors

  - ***CRF, liver cirrhosis:*** Deranged renal function can cause lower insulin requirements due to decrease clearance of insulin
  - ***Excessive alcohol intake***
  - ***Postprandial reactive hypoglycaemia***

Details of complications of DM

- **Microvascular complications:**
  - *"Do you have any numbness or burning sensation in your hands or feet?"* ***(Neuropathy)***
  - *"Any visual problems"* ***(Retinopathy)***
  - *"Any frothing in your water works."* ***(Nephropathy)***
- **Macrovascular complications:**
  - *"Any history of heart attacks or exertional chest pain?"* ***(CAD)***
  - *"Any pain in your legs on walking?"* ***(Peripheral vascular disease)***
- **Autonomic complications:**
  - *"Any early satiety?"* ***(Gastroparesis)***
  - *"Any light headedness on suddenly standing or dry feet?"* ***(Postural hypotension)***
  - *"Do you have any problem in maintaining sexual relations?"* ***(Erectile dysfunction)***
- **Balance:**
  - *"Any problem with your balance?"*
- **Motor:**
  - *"Do you have any difficulty in rising from chair?"*

Differential diagnosis for the leg pain

- Peripheral vascular disease
- Neuropathy, nerve entrapment & spinal problems

Discussion

- **Hypoglycaemia:** Plasma glucose level <2.5 mmol/L.

Whipple's triad:

- Hypoglycaemic symptoms
- Low blood sugar
- Symptoms relief after glucose intake

Hypoglycaemia unawareness

- Loss of the warning symptoms of hypoglycaemia. Switching from animal insulins to human insulin may also cause hypoglycaemia unawareness.

Management

- Diet adjustments with snacks
- Lifestyle changes
- **Change of insulin regime:** basal bolus insulin regime or converting back to a porcine or bovine insulin
- Avoidance of tight glycaemic control
- **Stop non-selective β-blockers:** Non-selective β-blockers may cause hypoglycaemic unawareness and impair glycogenolysis; a relatively selective β-blocker (metoprolol is preferable if a β-blocker is indicated.
- **Driving:** advised to stop driving and to inform DVLA until the hypoglycaemia is resolved especially.

Funny turns

- Disturbance of consciousness which may be transient
- **Causes:**
  - Syncope / simple faints
  - Severe vertigo
  - TIA, basilar migraine, drop attacks
  - Epilepsy
  - Hydrocephalic attack
  - Cardiac dysrhythmias
  - Hypoglycaemia
  - Hypocalcaemia
  - Cataplexy, narcolepsy, sleep paralysis

Drop attacks

- Falling without losing consciousness or any warning signs, or dizziness due to unpredictable sudden change in muscle tone of lower limbs resulting in transient weakness in lower limbs. It is thought to originate from brainstem. More common in women of middle age.

Coma vigil

- State of impaired consciousness with muttering (muttering delirium) observed in fever due to infections like pneumonia, enteric, etc.

20. Haemoptysis

Your role: You are the doctor in a respiratory clinic

Patient: Mr. Ghulam Fareed, aged 75

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This elderly COPD patient has few weeks history of recurrent hemoptysis.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of haemoptysis

  - *"Are you coughing up fresh red blood or it is discoloured brown phlegm?"*
  - *"Is the blood mixed in with phlegm or coating it?"*

- **Duration:** *"Since how long you have the problem?"*
- **Severity:** *"How much it was, about a spoonful or egg-cup full? ... How many times you have coughed up blood?"*
- **Associations:**
  - ***Bronchial carcinoma or mesothelioma:*** *Any coughing of blood with chest pain, shortness of breath, weight loss or loss of appetite, hoarseness of voice, swallowing difficulty? Any work history as a plumber or on shipyard?"*
  - ***TB:*** *"Any evening fever with drenching sweats, weight loss?"*
  - ***COPD exacerbation:*** increased phlegm volume with purulence and breathlessness
  - ***Bronchiectasis:*** *"Any history of recurrent infections of lungs in childhood?* (Childhood pneumonia) *Any past history of pulmonary tuberculosis?"*
  - **Pulmonary embolism:** "Any sudden onset chest pain, breathlessness, blood clot in the blood channels of your legs?"
  - ***Mitral stenosis:*** *"Any past history of tight or narrowing of heart valves, palpitations?"*
  - ***Bleeding disorder, anticoagulants***

▶ INVESTIGATIONS

- CBC, RFTs, LFTs, calcium
- CECT chest
- Bronchoscopy
- Endobronchial Ultrasound (EBUS): EBUS has replaced mediastinoscopy under GA
- SaO2 on air
- ECG
- Spirometry

21. Headache

Your role: You are the doctor in a neurology clinic

Patient: Mrs. Sadia Matee, aged 45

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This young lady with few years' history of recurrent bouts of periorbital facial pain usually left sided; and occasional episodes of throbbing headache being felt as a tight band around the whole head exacerbated by bouts of depression.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of headache

Two types of pain are present: facial (facial pain around left eye) and headache.

- **Site:** *"Where exactly the pain is?"*
- **Onset:** *"Since how long you have the pain? ..... Is it constant or comes and goes? ... Does it come on suddenly? ... How long it lasts for? ... How frequently it occurs? ... How long are the longest pain free periods? ... When was the last attack?"*
- **Character of pain:** *"What type of pain it is? ... Feeling of tight band around head, throbbing or excruciating?"*
- **Radiation:** *"Does it move anywhere like back of head or neck?"*
- **Timings:** *"Is it worse at any particular time of the day like on awakening?"*
- **Exacerbating/alleviating factors:**

  "What makes it worse?"
  - *"Coughing, straining, sneezing, bending, exertion?"* ***(SOL Brain / stress at work)***
  - *"Any particular food or drinks like alcohol, cheese? ... Lack of sleep; fasting; exercise / stress; bright lights; noise?"* ***(Migraine)***

  "What makes it better? ... Any relief from painkillers & sumatriptan?"
- **Severity:** *"How bad is the pain on a scale of 1-10? ...... Does it wake you up from sleep?"*
- **Associations (D/D):**
  - ***Migraine:***
    - **Prodromal symptoms (classic migraine):**
      - Visual symptoms-- flashing lights, blind patches (negative aura)
      - GI symptoms-- nausea and vomiting
      - Cerebral symptoms -- numbness and weakness of limbs, ataxia
  - ***Cluster headache***
  - ***Chronic paroxysmal hemicrania:*** analgesics overuse
  - ***Tension type headache:*** any associated depression, anxiety
  - ***Occipital headache:*** due to cervical spondylosis
  - ***Post coital headache***
  - ***Idiopathic intracranial hypertension***

- ***Glaucoma:*** Visual changes, haloes around light
- ***ENT problem:*** Sinusitis, ear problems, toothache
- ***SOL brain:*** Pain aggravated by coughing, sneezing, straining or bending
- ***Carotid artery dissection***
- ***CVST***
- ***Trigeminal neuralgia:*** Sudden onset pain triggered by chewing, talking or shaving
- ***Temporal arteritis***

Discussion

Scottish Intercollegiate Guidelines Network for CT scan head in headache

CT head scan head is not recommended for the investigation of primary headaches unless the following 'Red Flag' features are present:

- Sudden-onset thunderclap headache
- Headache with focal neurology
- New onset headache or change in headaches in patients over 50 years
- Headaches that change with posture or wake the patient up from sleep
- Presence of other comorbidities (e.g. history of cancer, or CVST)

CLUSTER HEADACHES

Each episode lasts 2 - 4 hours with once or twice a day episode for a fortnight followed by pain free periods for many months. Usually occurring at night.

- **Prophylaxis**:
  - Calcium channel blockers (e.g. verapamil) or
  - Glucocorticoids
- **Acute attacks:**
  - High-flow oxygen or
  - 5-HT1 receptor agonists (e.g. sumatriptan): quicker onset of action and longer pain-free duration if given via the intranasal or subcutaneous routes.

CHRONIC PAROXYSMAL HEMICRANIA

- **Clinical Features:**
  - Similar to cluster headaches but duration of attacks is shorter (3-45 minutes) appearing more frequency (20-40 times / day).

    (In cluster headache, clusters occur several times per year. Each cluster persists for 4-8 weeks with daily episodic headache appearing 1-3 times, while each episode of headache lasts 15-180 minutes.
- **Treatment:**
  - Indomethacin

TENSION HEADACHES

- Exacerbated by depression
- Normally managed adequately with paracetamol (add codeine if no relief)

22. Hoarse voice

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Khalida Parveen, 47 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This middle age smoker lady has 6 months history of hoarse voice. She uses beclomethasone inhaler for chronic bronchitis and omeprazole for GERD.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of hoarse voice

- **Duration:** *"Since how long you have the hoarse voice?"*
- **Onset:** *"How did it develop? ... Did it develop after a bout of viral laryngitis?"*
- **Progression:** *"Is it getting worse over time?"*
- **Ever had it before:** *"Have you ever had hoarse voice before?"*
- **Associations (D/D):**
  - ***Chronic laryngitis***
    - *"Do you gargle after using beclomethasone inhaler? ... Do you excessively use it? ... Did you develop the hoarseness after starting it and it was not before that? ... Do you use volumatic spacer device with your inhalers?"* ***(Secondary to corticosteroid inhaler)***
    - *"Do you excessively use your voice at your workplace like announcements?"* ***(Voice overuse)***
    - *"Any heartburns or water brash?"* ***(GERD)***
  - ***Recent sore throat:*** *"Is it after a bout of viral laryngitis?"*
  - ***Laryngeal polyp or carcinoma***
  - ***Vocal cord paralysis secondary to lung cancer:*** *"Do you smoke? Any cough, phlegm or phlegm containing blood or chest pain and shortness of breath?"*
  - ***Hypothyroidism:*** *"Do you have any cold intolerance or any preference for warm weather with change into croaky voice?"*
  - ***Smoke inhalation:*** *"Any exposure to fire or smoke?"*

▶ INVESTIGATIONS

- **CXR:** Bronchial carcinoma with left recurrent laryngeal nerve palsy
- **Routine blood tests**
- **Laryngoscopy by ENT surgeon**
  - ***Acid reflux:*** inflamed vocal cords
  - ***Vocal cord polyps***
  - ***Laryngeal candidiasis:*** beclomethasone inhaler

Advise gargling after using beclomethasone inhaler, using it less often and with volumatic to prevent the aerosol impact on the pharynx and larynx.

23. Hypercalcaemia

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Fehmida Mushtaq, aged 50

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 50-year-old lady is found to have hypercalcemia on routine testing. She has a history of peptic ulcer disease 10 years ago & depression for last few years.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of hypercalcaemia symptoms

- *"Do you have any? ..."*
    - *"Bony pains"* **(Bones)**
    - *"History of tummy pain radiating from loin to groin* **(renal stones)**
    - *"How often you pass water? ... Are you passing large volumes? ... Do you have to wake up at night to pass it? ... Are you drinking large volumes of water?"* **(Polyuria & polydipsia - thrones)**
    - *"Any constipation or tummy pain?"* **(Peptic ulcer pain - abdominal groans)**
    - *"Any depression, tiredness?"* **(Psychic moans)**

(Apply DOP SAREA)

- **Associations:**
    - ***Hyperparathyroidism (MEN 1 & 2)***
        - *"Do you have any vision problem with your side vision? ... Any frontal headaches? ... Changes in hand or feet size?"* ***(Pituitary macro-adenoma)***
        - *"Any tummy pain?"* *peptic ulcer pain* *(Pancreas - gastrinoma)*
        - *"Any fatigue, depression, confusion, constipation, increase thirst, increased frequency and volume of waters?* ***(Parathyroid)***
        -
        - *"Any swelling in front of neck?"* ***(Thyroid medullary carcinoma)***
        - *"Any sudden fluctuation of BP, racing of your heart, profuse sweating, headache, faints or funny turns on standing from sitting position at the time of raised BP, panic attacks?"* ***(Adrenal adenoma)***
        - *"Any fatigue, depression, confusion, constipation, increase thirst, increased frequency and volume of waters?* ***(Parathyroid)***
        - *Mucosal neuromas/ marfanoid appearance*
    - ***Malignancy:*** Breast, lung, prostate, hematological, multiple myeloma
    - ***Sarcoidosis/TB:*** *"Any cough, fever, weight loss shortness of breath?"*
    - ***Hypocalciuric hypercalcemia:*** family history
    - ***Vitamin D intoxication***

  - ***Drug history:*** Vitamin D analogues, thiazides, lithium
  - ***Immobility (high bone turnover):*** lack of exercise
  - ***Thyrotoxicosis***

INVESTIGATIONS

- **ECG:** Short QT interval, cardiac arrhythmias
- **Serum Ca^{+2}, PO^{+4}**
- **PTH**
  - ***Hyperparathyroidism:*** Raised
  - ***Malignancy related hypercalcemia:*** Undetectable or low due to secretion of PTHrP
  - ***Vitamin D-related / high bone turnover causes:*** Undetectable or normal
- **Radioisotope subtraction scanning:** Preoperative localization

MANAGEMENT

- **Primary hyperparathyroidism:** Parathyroidectomy especially if stones, bony involvement, calcium > 2.9 mmol/L or a previous episode of severe acute hypercalcaemia.

Discussion

- Asymptomatic hypercalcaemia in adults is usually because of primary hyperparathyroidism. While, hypercalcaemia associated with malignancy usually presents with features of malignancy instead of hypercalcaemic symptoms.

Calcium Levels	Features
> 2.9 – 3.2 mmol/L	Symptoms
> 3.2 mmol/L	Ectopic calcification (kidneys, skin, lungs, heart and stomach)
3.7 - 4.5 mmol/L **(Severe hypercalcaemia)**	Coma and cardiac arrest (medical emergency)

24. Hyperlipidaemia

Your role: You are the doctor in a diabetes clinic

Patient: Mr. Dost Muhammad, 50 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 50-year-old overweight man having DM (on basal bolus insulin) have raised cholesterol and triglycerides.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of hyperlipidaemia

- Ask about stroke, IHD/CCF, peripheral vascular disease, kidneys, eyes

Cardiovascular risk factors

- DM
- Hypertension
- Blood fat levels (Hyperlipidaemia)
- Smoking and alcohol
- Full dietary, and exercise history
- Family history

▶ MANAGEMENT

- **Dietary advise:** Reduce fat intake & alcohol
- **Exercise and weight reduction**
- **Statins**
- **Changing insulin regimen**: Switch to basal bolus insulin regimen (fast-acting insulins Humalog and Novonorm with long acting insulins). Because snacks are not needed with fast acting insulins which help in weight reduction.

Combined use of thiazides and B-blockers may adversely affect the lipid profile.

Discussion

- Type 2 diabetics having no past history of MI are said to have cardiovascular risk equivalent to that of a non-diabetic patient who has had an MI.
- 10 years cardiovascular risk profiles is better indicator of future cardiovascular risk instead of treatment cut-off levels for hypercholesterolemia. Cardiovascular risks of >20% are becoming more acceptable for the treatment of cholesterol. With respect to proteinuria & hypertension, an ACEI or an ARBs should be included in the treatment. In the Steno-2 study it has been shown that intensive multifactorial intervention for patients with type 2 DM (i.e. aiming for intensive control of hyperglycaemia, hypertension, hyperlipidaemia and microalbuminuria) reduces the risk of cardiovascular disease and microvascular complications by 50% over an 8-year period.

25. Jaundice

Your role: You are the doctor in a gastroenterology clinic

Patient: Mr. Behram Zaffar, 56 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 50-year-old man have 04 days history of jaundice, right hypochondrial pain, malaise and nausea. He is a heavy alcoholic. His is on co-codamol for arthritic pain and had a surgery 10 years ago requiring blood transfusion for fracture neck of femur.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of jaundice

- **Duration:** *"When you noticed yellowish discolouration of whites of your eyes and skin? ...... What is the colour of your water works? ... Is it dark coloured?"*
- **Onset:** *"How quickly it appeared?"*
- **Progression:** *"Is it worsening with time?"*
- **Ever had it before:** *"Have you ever had it before or any family history of such problems?"*
- **Associations (D/D):**
    - ***Post-hepatic (cholestatic):*** *"What is the color of your bowel works? ... Are they pale or clay coloured?*
        - *"Do you have any itching, bone pains or difficulty in getting out of chair without using arms?"* ***(Primary biliary cirrhosis)***
        - *"Do you have any tummy pain, fever or chills?"* ***(Cholangitis / Gallstone)***
        - *"Any loss of weight with abdominal pain?"* ***(Malignancy)***
    - ***Hepatic (hepatocellular):***
        - *"Do you have any preceding flu like illness with fever, feeling sick or being sick, loss of appetite? Any recent history of travel or consuming shell-fish or food from unhygienic place?"* ***(AVH)***
        - *"Any swelling of your feet or tummy, any blood in your bowel works or vomiting containing blood, any change in your sleep pattern? ... Any piercing, tattooing, blood transfusions, use of prohibited drugs through blood channels, sexual encounter with such persons?"* ***(Hepatitis B & C)***
        - *"Do you drink?" Alcohol history, CAGE questionnaire, driving offences* ***(Alcoholic hepatitis)***
        - *"Any joint pain, fever or rash?"* ***(AIH)***
        - *"Any stiffness or shaking of limbs or any psychiatric problem?"* ***(Wilson's disease)***
        - *"Do you have any joint pain, darkening of skin, increased thirst and increased frequency of water works?"* ***(Haemochromatosis)***
        - *"Any difficulty in breathing or whistling sound from your chest?" Young, non-smoker with COPD* ***(α1 anti-trypsin deficiency)***

    - *"Have you ever had a clot in the blood channels of your legs or lungs? Have you noticed the swelling of your tummy increasing rapidly in a few days span with pain?"* ***(Budd-Chiari syndrome)***
    - *"Are you taking any medicines including over the counter medications or recently underwent any surgical procedures requiring GA?"* *Methotrexate, INH, paracetamol, amiodarone, phenytoin, halothane* ***(Drug induced)***
    - *"Any recent exposure of swimming in a pool?* ***(Leptospirosis)***
  - ***Pre-hepatic (hemolytic):***
    - *"Any racing of your heart, fatigue, difficulty in breathing on exertion?"* ***(Haemolytic anaemia)***

INVESTIGATIONS

- **Baseline labs:** CBC, U&E, LFT, GGT, Coagulation profile, BSR
- **HBsAg, anti-HCV Ab, CMV antibodies**
- **USG Abdomen**
- **Autoimmune screening**
  - Anti-mitochondrial antibodies (AMA)
  - Anti-smooth muscle antibodies (ASMA)
  - Anti-liver kidney microsomal antibodies (anti-LKM Ab)
- **Immunoglobulins**
- **Serum Caeruloplasmin**
- **Serum Ferritin and TIBC**
- **α-fetoprotein**

Discussion

Causes of painful jaundice

- Acute hepatitis (Alcoholic, AVH, Drug induced)
- Budd-Chiari Syndrome
- Liver metastasis
- CCF
- Wilson's disease

Causes of painless jaundice

- Cirrhosis
- Haemolysis
- Gilbert's syndrome
- Pancreatic or biliary malignancy

CAGE questionnaire

Detection rate up to 70% if $\geq$ 2 present

- Have you ever felt you should **c**ut down your drinking?
- Have people **a**nnoyed you by criticizing your drinking?
- Have you ever felt bad or **g**uilty about your drinking?
- Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover? (**E**ye opener)

26. Joint pains

Your role: You are the doctor in a rheumatology clinic

Patient: Mrs. Mah Jabeen, 35 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 35-year-old lady with esophageal reflux have painful swollen joints of hands for last 5 weeks.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of painful swollen joint

- *"Which joints are painful?* **(small or large joints)** ...... *Are they swollen as well?* **(arthralgia or arthritis)** ...... *Do you have pain in any other joints as well?"*
- *"Does it involve both the sides at the same time?"* **(Symmetrical or asymmetrical)**
- *"Do you have pain in your back as well?"*

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, writing, using cutlery, social life and work, e.g. typing? ... Does it persist throughout the day and night? ... Does it affect your sleep? ...... Any associated morning stiffness? ... Duration of morning stiffness?"*
- **Aggravating factors:** *"What makes it worse? ... activity or rest?"*
- **Relieving factors:** *" What makes it better? ... activity or rest?"*
- **Associations (D/D):**
  - ***Symmetrical arthropathy:***
    - ***RA:*** *"Are your joint stiff when you woke up? ... Is it more than or less than 06 weeks duration?"*
    - ***SLE & drug induced lupus*** *(Procainamide or hydralazine)***:** *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
    - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*
    - **Vasculitis**
  - ***Asymmetrical:***
    - ***Seronegative spondyloarthropathies:*** *"Do you have pain or stiffness in your back?"*
      - ***Ankylosing spondylitis***
      - ***Enteropathic arthropathy (IBD):*** *"Any loose bowel works?"*
      - ***Psoriatic arthropathy:*** *"Any scaly skin rash?"*
      - ***Reactive arthritis:*** *"Any stinging in your water or recent loose stools?"*
        Reiter's syndrome: *asymmetrical DIP joint arthropathy, uveitis, urethritis*
    - ***Gout:*** *"Do you have any acute attacks of joint swelling? ... What triggers the attack? ... How often the attacks are?"*

  - **Rheumatic fever**
- ***Monoarticular:***
  - Trauma
  - Osteoarthrosis
  - Gout
  - Pseudo-gout
  - Septic
  - Malignancy

Details of oesophageal reflux

- **DOP SAREA**

▶ INVESTIGATIONS

- **CBC, ESR, urea & electrolytes, LFTs**
- **Serology**
  - ***RA factor:*** Positive in approximately 70% of cases
  - ***Anti-cyclic citrullinated peptide (anti-CCP) antibodies***
  - ***Autoimmune screening*** (ANA, anti DsDNA, Anti ENA antibody, ANCA, complement levels)
- **Joint X-rays or MRI**
- **Joint aspiration for RE, culture and sensitivity**

▶ MANAGEMENT (RA)

- **DMARDs:** Methotrexate, hydroxychloroquine, leflonomide, sulfasalazine, gold (rarely used)
  Penicillamine, azathioprine, cyclosporine —unclear role
- **Biological agents:**
  - ***TNF alpha inhibitors:*** infliximab, etanercept, adalimumab, certolizumab, golimumab, adalimubab
    INDICATIONS:
    - Failure of two DMARDs + DAS 28 > 5.1 **OR**
    - Methotrexate contraindicated
  - ***Beta cell depletion:*** Rituximab (failure of DMARDs & TNF alpha inhibitors)
  - ***IL 1 & 6 inhibitors:*** Anakinra, Toclizumab
  - ***Disruption of T-cell function:*** Abatacept

  Target DAS 28 score < 3

27. Loin pain

Your role: You are the doctor in an endocrine clinic

Patient: Mr. Rashid Khokhar, aged 75

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 75-year-old patient of acromegaly presented with recurrent right sided loin pain.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of loin pain

- **Site:** *"Where exactly the pain is?"*
- **Onset:** *"How did it develop? Suddenly or gradually? What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... Is it colicky?"*
- **Radiation:** *"Does it move to your groin?"*
- **Associations:**
  - *Renal stones*
  - *Blood clots*
  - *Prostatic obstruction pre-disposing to hydronephrosis*
  - *Pyelonephritis*
  - *Renal cancer*
  - *Hydronephrosis*
  - *Trauma*
  - *Cyst rupture*
- **Timings:** *"Since how long you have the pain? ... Is it constant, or comes and goes? ... How long it persists? Have you ever had it before? .... How many times?"*
- **Exacerbating /relieving factors:** *"What makes it better? ..... What makes it worse?"*
- **Severity:** *"How bad it is on a scale of 1-10?"*

Details of acromegaly

- *"Do you have any change in appearance, increased size of hands, ring tightening, or deep / hollow husky voice?"*
- *"Any visual problem or headache?"*
- *"Any goitre or excessive sweating?"*
- *"Any tiredness, impotence or poor libido, milk expression from nipples?"*
- *"Any weakness and weight gain?"*
- Details of DM, hypertension, heart failure, arthropathy, carpal tunnel syndrome

▶ INVESTIGATIONS

- Plain abdominal X-rays
- USG KUB, CT KUB

- Ca^{+2}, RFTs
- Mid-stream urine (MSU)
- Intravenous urogram

Discussion

Clinical features

- Loss of visual field loss caused by compression of the optic nerve
- IGTT and diabetes
- Hypertension
- Renal stones due to increased urinary excretion of calcium
- Increased risk of gastric and colonic neoplasms
- **Skeletal:** kyphosis, scoliosis and accelerated osteoarthrosis
- **Cardiac:** accelerated atherosclerosis and cardiomyopathy
- **Overgrowth of soft tissues:** goitre and carpal tunnel syndrome
- **Skin changes:** acral bony overgrowth (frontal bossing), soft tissue swelling, excessive sweating and hypertrichosis

28. Lower GI haemorrhage

Your role: You are the doctor in a gastroenterology clinic

Patient: Mr. Jan Muhammad, 52 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 52-year-old man presented with 03 weeks history of passing dark red blood mixed in with his stools without any weight loss. He has osteoarthritis of knee joints for which he is taking diclofenac and a past medical history of hemorrhoids.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of rectal bleed

- *"Did you see any blood on the stools or on the toilet paper? ...... Was it bright red or black? ...... Do you get it in the beginning, during your or at the end bowel movement? ...... Was it coating the stools or was mixed in the stools? ...... Any mucus or slime in it?"*
- *"Is it intermittent or you have it with each bowel movement?"*

- **Duration:** *"Since how long you have this problem?*
- **Severity:** *"How much blood is there in your bowel works at a time? ... How often in a day?"*
- **Ever had it before:** *"Have you ever passed blood through your back passage before? ... How often?"*
- **Associations:**
  - ***Hemorrhoids/anal fissures:*** Fresh blood over the surface of the stool or on the toilet paper. Ask about constipation & straining.
    - *"Any lump coming out of back passages?"* ***(Haemorrhoids)***
    - *"Any pain on passing bowel works?"* ***(Anal fissures)***
  - **Lower GI bleed:** *"Any weight loss? .... Any family history of bowel cancers, polyps?"*
    - Rectal and sigmoid carcinomas: bleeding mixed in with stools
    - Descending colon lesions: altered bowel habit
    - Caecal lesions: Occult blood with iron deficiency anaemia only

    (Neoplasm, diverticular bleeding, colonic / rectal polyps, angiodysplasia/ HHT)
  - **Colitis:** *"Any diarrhea; blood, or slime in bowel works; sours in the mouth; joint pain, rash; or tummy pain? ...... Do you have to wake up at night for bowel movements? ...... Do you need to rush to the toilet for bowel movements? (Urgency) ...... Do you have an urge for a bowel movement even if have already one, with crampy pain at your back passage? (tenesmus)"*

    (Ulcerative colitis, ischemic colitis, radiation colitis, NSAIDs, infective colitis)
  - **Upper GI bleed:** *"Any blood in vomiting, upper central tummy pain, or abdominal distension?"*
  - **Bleeding disorders or anticoagulants**
  - **Iron, bismuth:** black stool

▶ INVESTIGATIONS

- Sigmoidoscopy or colonoscopy
- Double-contrast barium enema

29. Macrocytic anaemia

Your role: You are the doctor in a general medical clinic

Patient: Mr. Abdul Rehman, 85 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 85-year-old man living in residential home is noticed to be pale with Hb 6 g/dL & MCV 112 fL.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of symptoms related to anaemia and pancytopenia

- *"Do you have any difficulty in breathing, racing of the heart, tiredness or fatigue?"* **(anaemia)**
- *"Any bleeding from nose, gums, or any other site?"* **(thrombocytopenia)**
- *"Any fever?"* **(neutropenia)**
- *"Any yellow staining of whites of your eyes, soreness of tongue (glossitis); any numbness or tingling in the feet, any issue with balance (SCD of cord)?"* **(B12 deficiency)**

(DOP SAREA)

- **Associations (D/D)**
  - ***Megaloblastic causes:***
    - *"Any bulky, foul smelling and difficult to flush away bowel works? ... Any diarrhoea? ... Any surgery on your tummy, stomach or bowel?"* ***ileal disease, Crohn's disease, bacterial overgrowth, celiac disease, tropical sprue, gastrectomy, ileal resection*** ***(Malabsorption)***
    - *"Do you take a balanced diet including meat, dairy products? ... And not a strict vegetarian? ...... Any use of over cooked vegetables?"* ***(Dietary deficiency)***
    - *"Any worms in bowel works?" (Fish tapeworm infestation)*
    - Atrophy of the gastric mucosa results in deficiency of intrinsic factor due to production failure leading to vitamin B12 malabsorption **(Autoimmune gastritis, pernicious anaemia)**
    - Haemodialysis **(folate loss)**
    - Psoriasis **(increased folate utilisation by rapid skin turnover)**
  - ***Non megaloblastic causes***
    - Hypothyroidism
    - Chronic liver disease
    - Alcohol excess
    - Reticulocytosis
    - Antifolate drugs: methotrexate, trimethoprim, phenytoin

▶ INVESTIGATIONS

- **CBC:** raised MCV anaemia (MCV > 110 fL in megaloblastic anaemia)
- **B12 & folate levels:** B12 < 100 ng/L and folate <4 µg/L highly suggestive of deficiency
- **LFTs**

- **TSH**
- **Anti-parietal cell antibodies** (90% of patients with pernicious anaemia)
- **Anti-intrinsic factor antibodies** (50% of patients with pernicious anaemia)
- **Bone marrow examination:** if doubt (bone marrow in megaloblastic anaemia contains erythroblasts with delayed nuclear maturation due to B12 or folate deficiency)
- **Schilling test:** to differentiate the cause of B12 deficiency, i.e. pernicious anaemia, or terminal ileal disease or bacterial overgrowth
- **Small bowel studies:** if relevant

▶ TREATMENT

- **Vitamin B12 deficiency:** hydroxycobalamin 1000 µg IM every week for 4 weeks and then 1000 µg intramuscularly every 3 months for life.
- **Endoscopy**

30. Neck lump (lymph nodes)

Your role: You are the doctor in a general medical clinic

Patient: Mr. Asad Qureshi, 40 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 40-year-old Bangladeshi man have a firm nodule on right side of neck for last 3 months.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of swelling in the neck

- *"Where exactly is the swelling in your neck?"*
- *"Does it move with swallowing?"*
- *"Any pain in it?"*
- *"Any problem with your voice, or any swallowing or breathing difficulty due to swelling?"*
- *"Do you have swelling anywhere else?"*

- **Duration:** *"When did you first notice it?"*
- **Progression:** *"Is it increasing or fluctuating in size?"*
- **Associations (D/D):**
  - **Lymphoproliferative disorder:** *"Do you have any loss of weight, fever or itching?"*
  - **TB lymphadenitis:** *Do you have any loss of weight, fever or cough or anyone in the family with tuberculosis?"*
  - **Metastatic lymph node:** from a head and neck neoplasm (thyroid), GIT
  - **Sarcoidosis:** *"Any shortness of breath, joint pains, redness of eyes, fever?"*
  - **Non-specific viral infections or infectious mononucleosis or CMV**
  - **HIV lymphadenopathy**

▶ INVESTIGATIONS

- **FNAC**
- **Excision biopsy:** for histopath, cytology and culture for acid-and alcohol-fast bacilli

Contact tracing if tuberculous lymphadenitis

31. Painful shins

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Fazeelat Niaz, age 43

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 43-year-old woman have painful red raised lesions on shins for the last 2 weeks.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of skin lesions

- *"Where exactly the rash is on your shins? .... Do you have rash anywhere else?"* **(site)**
- *"How does it look like?"* **(shape, size, colour, raised or flat)**
- *"Do you have pain or itching in it? ... Or any bleeding or discharge from it?"*

- **Duration:** *"Since how long you have this problem?"*
- **Progression:** *"Is it getting better or worse?"*
- **Aggravating or relieving factors:** *"What makes it better? ..... What makes it worse?"*
- **Associations (D/D of erythema nodosum):**
  - **Streptococcal sore throat**
  - **Chest:**
    - **Sarcoidosis:** Malaise, fever, cough, arthralgia
    - **Tuberculosis:** Fever, cough, sputum, haemoptysis
    - **Mycoplasma, psittacosis**
    - **Fungal:** Coccidioidomycosis, histoplasmosis
  - **Inflammatory bowel disease**
  - **Drugs:** sulphonamides, OCPs, iodides, bromides.
  - **Skin:** leprosy
  - **Idiopathic**

▶ INVESTIGATIONS

- Throat swab (in streptococcal sore throat)
- CXR
- Sputum for AAFB
- CBC, ESR
- ACE level
- Mycoplasma serology
- Barium follow through, colonoscopy

▶ TREATMENT (SYMPTOMATIC)

- Bedrest
- NSAIDs
- Oral steroids
- Stop the offending drug like OCPs

Erythema nodosum:

- These are painful & tender nodules of dusky blue-red colour which commonly present over the shins. These nodules fade over a couple of weeks leaving a bruised appearance. Common in young adults, particularly women. Fever, arthralgia and malaise may be present. It is caused by inflammation in the dermis and subcutaneous layer (called panniculitis).

32. Painful shoulders

Your role: You are the doctor in a general medical clinic

Patient: Mr. Ansar Mehmood, 71 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 71-year-old man have 4 weeks history of painful shoulders and a stiff neck.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of painful stiff shoulders and stiff neck

"Can you please tell me what exactly the problem is?"

- *"Is it pain and stiffness only? ... Or pain and stiffness with weakness? ... Or weakness only without pain and stiffness? ...... Are the affected areas sore to touch? ...... Do you have bone pain as well?"* **(Description)**
- *"Where you have the problem?"* **(Site)**
- *"Do you have any rash? ... Where?"*
- *"Do you have any bone pains?"*

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"How did it develop? ..... Suddenly or gradually?*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is?*
- **Aggravating or relieving factors:** *"What makes it better? What makes it worse?*
- **Associations (D/D):**
  - **Polymyalgia rheumatica/ Giant cell arteritis:**
    - **Pain and stiffness only without weakness:** in shoulders, neck, upper arms, buttocks, hips or thighs.
    - Feeling of not being well (malaise), fever, weight loss.
    - Visual problems, tenderness over temporal areas or jaw pain when eating.
  - ***Polymyositis/Dermatomyositis:***
    - **Pain with weakness in affected areas:** Difficulty in walking upstairs or getting out of chair without using her arms; or raising arms above the head. (Proximal muscle pain with weakness)
    - **Rash**
  - ***Myopathy:*** Weakness without pain & stiffness in affected areas
  - **Fibromyalgia:** *"Are the affected areas sore to touch?" (No systemic features)*
  - **Osteomalacia:** Bone pains
  - **Cervical spondylosis:** *"Do you have pain on neck movement? ... Does it move to your arms?"*
  - **Trauma:** *"Do you have any injury to your neck?"*

Polymyalgia rheumatica

- This Inflammatory condition occurs > 50 years of age, associated with mild synovitis and subclinical arterial inflammation. 15–30% of patients develop giant cell arteritis.
- It may have acute or subacute onset, presenting as severe pain and stiffness of the neck, pectoral and pelvic girdles. There is morning stiffness and stiffness after inactivity. Systemic complaints may be present including fever, malaise, weight loss and depression (cachectic PMR may mimic cancer). ESR is dramatically elevated, often >100. CRP is also raised and a more sensitive marker of disease activity.
- No small joint synovitis is present as in RA. Muscle enzymes are not raised. Systemic features are present in PMR along with elevated ESR but absent in fibromyalgia.

Treatment (symptomatic)

- **Corticosteroids**
  - ***PMR:*** Prednisolone 15 mg OD (dramatic response within 48 hours)
  - ***Temporal arteritis:*** Prednisolone 60 mg OD started immediately to prevent blindness

  Taper the corticosteroids to the minimum effective dose once the symptoms subside, regardless of the ESR. Corticosteroids can be discontinued in some patients within 2 years, but corticosteroids can be required in small amounts for years. Use bisphosphonates to prevent steroid induced osteoporosis.

  Note: NSAIDs are less effective and should be avoided.

33. Palpitations

Your role: You are the doctor in a cardiology clinic

Patient: Mr. Chaudhary Mushtaq, 78 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 78-year-old man had an attack of palpitations and dizziness whilst on the golf course 2 weeks ago.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of palpitations

- *"How does it feel like? ... Do you feel any racing or thumping of heart in the chest? .... How fast it is? ...... Does it tap out of the rhythm? ... Can you tap it out on the desk? ... Have you felt any missed beat? ... Did the next beat feel heavier?"*
- *"Did you ever check your pulse at that time? ... How fast it was? ... Was it regular or irregular?"* **(Regular: SVT, 2: 1 block; or irregular AF, variable block)**

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"Does it start and stop abruptly?* **(SVT)** *... Does it appear under specific situation or activity or any specific time?"*
- **Severity:** *"How long it persists? ...... How fast did the heart race?"*
- **Ever had it before:** *"Have you ever had it before? ... How often do you have it? ... How long ago you had the last attack?"*
- **Associations (D/D):**
  - *"Any heat intolerance or preference to cold, weight loss with increased appetite, shaking of hands?"* **(Thyrotoxicosis)**
  - *"Any chest pain, shortness of breath, swelling of feet?"* **IHD, MS, MR, AS, HOCM; PE, COPD, asthma, chest infections (Heart/Lungs)**
  - *"Any panic attacks, profuse sweating, headache, faints or funny turns on standing from sitting position, and raised BP?"* **(Pheochromocytoma)**
  - *"Do you use salbutamol inhaler? ... How often do you it?"* **(β_2 agonist)**
  - Anemia
  - Alcohol, caffeine, tobacco
  - Anxiety/depressive disorders

▶ INVESTIGATIONS

- CBC, TFTs
- ECG, 24-h ECG, echocardiogram
- CXR
- 24 hours urinary VMA

34. Pins and needles (peripheral neuropathy)

Your role: You are the doctor in a neurology clinic

Patient: Mr. Niaz Ali, 65 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 65-year-old man have 2 months history of pins and needles in both hands.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of pins and needles

- *"Can you please tell me where exactly the problem is? ... Which part of your hand or fingers? ... Up to which level? ... Is it in one hand or both? ... Which hand had the symptoms first? ... Or you left or right-handed?"*
- *"Do you have any other problems with your hands like pain, burning sensation (paraesthesia); feeling of heaviness or tingling; weakness, wasting or clumsiness/tremors?"*
- *"Do you have such symptoms in your feet as well?"*

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes it better?"*
- **Associations (D/D):**
  - **Entrapment Neuropathy (carpal tunnel syndrome):** tend to affect the dominant hand
    - Weight gain
    - Pregnancy
    - Hypothyroidism
    - Acromegaly
    - Cushing's'
    - Arthritis: RA, gout
    - Previous fractures of wrists
    - Repetitive injury with vibrating tools (stone cutter)
  - **Peripheral neuropathy**
    - DM
    - Alcohol, dietary deficiencies of vitamin B1, B6 and B12
    - Drugs: isoniazid, nitrofurantoin
    - RA
    - Renal failure
    - Malignancy
    - Thyrotoxicosis

  - HMSN: family history
  - Idiopathic

INVESTIGATIONS (CARPAL TUNNEL SYNDROME)

- **EMG/NCS:** reduced or absent median sensory nerve action potential (SNAP) and prolongation of the latency from the index finger. Denervation of abductor pollicis brevis on EMG.

TREATMENT (CARPAL TUNNEL SYNDROME)

- Night-time splints
- Local steroid injections (temporary relief)
- Surgical decompression

35. Polyuria

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Noreen Fahad, 40 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 40-year female have 2 weeks history of polyuria, feeling unwell & tired; persistent cough for last 4 months with numerous pulmonary infiltrates and bilateral hilar lymphadenopathy.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of polyuria

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:**
  - *"How often you pass the water? ... Are you passing large volumes? ... Do you have to wake up at night to pass it? ... What is its colour? ... Do you have any difficulty in starting micturition (hesitancy)?"*
  - *"Do you have increased thirst as well? ... How much fluid you take in a day? ... And what type of fluids you take ... Like tea?"*
- **Associations (D/D):**
  - **DM**
  - **Diabetes insipidus:**
    - ***Cranial:*** *"Do you have any visual problems?* ***(Visual field defects)*** *...... Any cold intolerance or preference for warm environment, any weight gain with reduced appetite?* ***(Hypothyroidism)*** *...... Any sexual or menstrual problems?* ***(Hypogonadism)*** *...... Any milky nipple discharge?* ***(Galactorrhoea)*** *...... Any dizziness on standing from sitting position, weakness?* ***(Hypoadrenalism)*** *...... Any heartburn?"* ***(MEN 1)***
      - CNS tumours: primary brain tumours including hypothalamus & pituitary; metastases
      - Infections: TB, meningitis, cerebral abscess
      - Infiltrations: neurosarcoidosis (pituitary involvement), Langerhans cell histiocytosis, hemochromatosis
      - Head trauma, neurosurgery
      - Post-radiotherapy
      - Haemorrhage or thrombosis, aneurysm
    - ***Nephrogenic:***
      - Hypercalcaemia: Bones, stones, thrones, abdominal groans, psychic moans
      - Hypokalaemia
      - Lithium
      - Familial
      - Renal tubular acidosis
  - **Psychogenic polydipsia (compulsive water drinking):** psychiatric history
  - **Diuretics**

▶ INVESTIGATIONS

- BSR
- Ca^{+2}
- ACE levels
- HRCT Chest
- Bronchoscopy with a transbronchial lung biopsy
- MRI brain
- Urine & serum osmolality (early-morning paired plasma and urine osmolality)
- **Water deprivation test:** (if early morning paired plasma and urine osmolality are normal) Withhold fluids while monitoring plasma and urinary osmolality. Stop the test if patient loses more than 3% of the total body weight on hourly measurements during the test and serum osmolality >300 mOsm/kg; give desmopressin and allow the patient to drink. Otherwise continue monitoring with plasma and urinary osmolality for 8 hours, then give desmopressin, and allow the patient to drink.
    - **Normal response**: Plasma osmolality does not rise above the normal range (280-295 mOsm/kg), urine/plasma (U/P) osmolality ratio rises to >2.0
    - **Diabetes insipidus**: Plasma osmolality rises to >300 mOsm/kg and the U/P ratio remains <2.0. Urine osmolality remains inappropriately low (high urinary volume) despite of raised plasma osmolality.
        - *Cranial:* Urine concentration increasing normally after administration of desmopressin.
        - *Nephrogenic:* Urine concentration does not increase after administration of desmopressin.

▶ TREATMENT

- **Intranasal synthetic vasopressin analogue desmopressin (DDVAP** -- D-amino D-arginine vasopressin**):** 10-20 μg OD or BD or orally 100-200 μg TDS.
- **High-dose prednisolone:** 40 mg OD for the sarcoidosis
- **Bisphosphonates:** to avoid long-term steroids complications

36. Pruritus

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Shehla Noman, 50 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 50-year old female have 6 months history of generalized pruritus and increasing fatigue.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of pruritus

- *"Where exactly you have the itching? ... From where it started first? ...... Do your eyes itch? .... Do you have itching anywhere else?* **(site)**

- **Duration:** *"Since how long you have the itching?"*
- **Onset:** *"At what time you have it? ... Is it persistent, or comes and goes?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"How bad it is? ... Does it affect your sleep or work?"*
- **Aggravating factors:** *"What makes it worse?" (stress, depression, drugs, certain foods)*
- **Relieving factors:** *"What makes it better?" (bath oils)*
- **Associations (D/D):**
  - ***Lymphoma:*** *"Do you have any fever, weight loss, and lumps in the body?"*
  - ***Polycythemia:*** *"Do you any blurred vision, ringing in ears, vertigo or headache?"*
  - ***Liver:*** *"Do you have any yellowish discoloration of whites of your eyes, clay coloured stools, bony pains, difficulty in rising from chair?"* **(Obstructive jaundice, PBC, intrahepatic cholestasis of pregnancy, cholestatic phase of AVH)**
  - ***CRF***
  - ***Skin diseases:*** skin rashes; scabies (anyone else at home having similar complaints)
  - ***Topical causes:*** exposure to fiberglass, soaps, detergents, washing liquids.
  - ***Drug induced***
  - ***Psychiatric illness:*** anxiety and depression
  - ***HIV infection***

▶ INVESTIGATIONS

- CBC
- FNAC with lymph node, excision biopsy (If lymphadenopathy)
- LFTs, ANA, anti-mitochondrial antibodies, hepatobiliary USG, liver biopsy etc. (if hepatic cause suspected)

▶ TREATMENT (PBC)

- Cholestyramine: 4g sachet three times per day
- Ursodeoxycholate: 10–15 mg/kg/day in 2-4 divided doses

37. Purpuric rash

Your role: You are the doctor in a hematology clinic

Patient: Mrs. Tehreem Amjad, aged 35 years

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 35-year female have 4 days history of purpuric rash without any obvious bleeding; and a platelet count 20×10^9.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of purpura

- *"Where exactly the rash is? .... Do you have rash anywhere else?* **(site)**
- *"How does it look like? ... Can you feel it? ... Does it disappear when you press it?"* **size, colour, shape (flat or raised), blanchability, itchy (Description)**

- **Duration:** *"Since how long it has been present?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Ever had it before:** *"Have you ever had the rash before?"*
- **Associations (D/D):**
  - ***Bone marrow failure:*** **(leukemia, marrow infiltration by malignancy, metastatic)**
    - *"Do you have bleeding from any site like gums, nose, in bowel works or water works, any vaginal bleeding or heavy periods?"*
    - *"Any difficulty in breathing, tiredness or racing of heart on walking?"*
    - *"Any fever or lumps in the body?"*
  - ***ITP:*** *"Did you have flu like illness before the rash?"*
  - ***Connective tissue disorders:*** SLE, APLAS
    - *"Any joint pains, oral ulcers, rash over sun-exposed areas, recurrent miscarriages?"*
  - ***HIV***
  - ***Liver disease:***
    - *"Any swelling of your feet or tummy, any change in your sleep pattern, any blood in your bowel works or vomiting containing blood?"*
  - ***TTP-HUS, DIC***
  - ***Drugs:*** heparin, warfarin, aspirin; steroids, sulphonamides, chloramphenicol.
  - ***Henoch-Schönlein purpura***
  - ***Infections:*** EBV, CMV, toxoplasmosis, dengue, HIV
  - ***Scurvy:*** lack of fresh fruit and vegetables

▶ INVESTIGATIONS (ITP)

- **Peripheral blood smear** for atypical cells

- **Bone marrow examination:** Normal or increased numbers of megakaryocytes
- **ANA** to rule out SLE
- **HIV**
- **Platelet antibodies** can be looked for but are not reliably specific.

TREATMENT (ITP)

- **Corticosteroids**
- **Rituximab or intravenous immunoglobulin (IVIG):** reserved for non-responder patients with severe thrombocytopenia and bleeding.
- **Emergency splenectomy:** reserved for non-responder patients who are desperately ill

ITP is an autoimmune disorder characterized by production of antibodies against antigens on the glycoprotein IIb-IIIa or glycoprotein Ib-IX complex.

38. Pyrexia

Your role: You are the doctor in a general medical clinic

Patient: Mr. Mubarak Akhtar, 35 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 35-year male developed fever after a business trip to Nairobi 04 weeks ago.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of pyrexia of unknown origin

- *"When you have returned from Nairobi? ... For how long you stayed there? ... Did you visit your GP before travelling and took any vaccination before travelling? ... Did you take any malaria preventive medicine before that? ... For how long you took these medicines?"*

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* **(Constant or intermittent)** *... How often does it peak in 24 hours?"*
- **Aggravating & relieving factors:** *"What makes it better?" (antipyretics)*
- **Ever had it before:** *"Have you had fever before travelling?"*
- **Associations (D/D):** *"Do you have any other symptoms with fever?"*
  - ***Infections:***
    - *"Any cough, phlegm, blood in phlegm, weight loss, chest pain, shortness of breath?"* ***(Pneumonia, TB, lung abscess)***
    - *"Any tummy pain or loose bowel works?"* ***(Liver abscess, IBD, gastroenteritis)***
    - *"Any stinging in water works, fever with rigors and chills?"* ***(UTI, pyelonephritis, PID)***
    - *"Any headache, shaking of limbs with altered consciousness, abnormal behaviour?"* ***(Meningitis, encephalitis, abscess)***
    - *"Any earache or discharge from the ear?"* ***(Otitis media)***
    - *Others:*
      - Malaria (rigors and chills with fever)
      - Enteric fever
      - Infective endocarditis
      - Brucellosis, toxoplasmosis, Q fever
      - Viral (EBV, CMV), HIV (assess contact with prostitutes)
  - ***Malignancy***
    - *"Do you have bleeding from any site like gums, nose, in bowel or water works, any vaginal bleeding or heavy periods? ...... Any difficulty in breathing, tiredness or racing of heart on walking? ...... Fever with drenching sweats or lumps in the body?"*

  - *"Any yellow staining of whites of eyes?"*
    (Lymphoma, leukemia, renal cell & hepatocellular carcinoma)
- ***Connective tissue & autoimmune diseases***
  - *"Any joint pain, mouth sores, skin rash?"* ***(SLE, RA, sarcoidosis)***
- ***Thyroiditis***
  - *"Any throat pain, heat intolerance, preference to cold weather?"*
- ***Drug induced***
- ***Factitious***
- ***Unknown causes***

INVESTIGATIONS

- CBC, MP slides
- Blood cultures
- CXR
- Full respiratory pathogen screen including viral, Chlamydia, Coxiella and Legionella
- Sputum for AAFB
- Bone marrow examination

Ask the patient for temperature charting. Review again shortly with the temperature record and blood results.

Discussion of this case relates to Pyrexia of unknown origin (PUO)

Malaria chemoprophylaxis

Start malaria prophylaxis one week before travel and continue at least four weeks after returning.

- Mefloquine 250 mg once per week; **OR**
- Chloroquine 300 mg once per week and Proguanil hydrochloride 200 mg OD (if intolerant to mefloquine), for sub-Saharan Africa where chloroquine resistance is widespread.
  (Proguanil is inadequate for total chloroquine-resistant plasmodium falciparum)

39. Renal colic and haematuria

Your role: You are the doctor in a general medical clinic

Patient: Mr. Danyal Aziz, age 70

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 70-year-old male had an episode of left sided renal colic accompanied with macroscopic hematuria 3 weeks ago.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

HISTORY (CHIEF COMPLAINTS)

Details of renal colic

- **Site of pain:** *"Where exactly the pain is?"*
- **Onset:** *"How did it develop? ... Suddenly or gradually? ... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... Is it colicky?"*
- **Radiation:** *"Does it move to your groin?"*
- **Associations:**
  - *Renal stones*
  - *Blood clots*
  - *Prostatic obstruction pre-disposing to hydronephrosis*
  - *Pyelonephritis*
  - *Renal cancer*
  - *Hydronephrosis*
  - *Trauma*
  - *Cyst rupture*
- **Timings:** *"Since how long you have the pain? ...... Is it constant, or comes and goes? ...... How long it persists? ...... Have you ever had it before? ... How many times?"*
- **Exacerbating /relieving factors:** *"What makes it better? ..... What makes it worse?"*
- **Severity:** *"How bad it is on a scale of 1-10?"*

Details of haematuria

"At what time you have bleeding in your water works? ..."

- *"Is it in the beginning of stream with clearing towards the end?* **(bleeding from urethra)**
- *"Or visible throughout the stream"* **(bleeding from urinary bladder or above)**
- *"Or at the end of stream?"* **(bleeding from urinary bladder base or prostate)**

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"Was it frank blood or diluted by urine?"*
- **Ever had it before:** *"Is it intermittent bleeding? ... Did you ever have it before?"*
- **Associations (D/D):**

- *"Do you have pain radiating from loin to groin? ... Have you ever passed stones in your water works?"* **(Renal stones)**
- *"Do you have intermittent bleeding?"* **Occupation Plastic, Dye, Rubber etc.** **(Bladder, kidney or prostate cancer)**
- *"Any swelling of the body, puffiness around eyes, raised BP?"* **(Glomerulonephritis)**
- *"Do you have any stinging while passing water?"* **(Cystitis/ pyelonephritis)**
- *"Any family history of renal disorders?"* **(APKD, Alport Syndrome, Sickle cell disease)**
- *"Any coughing of blood and fever?"* **(Wegener's / Good Pasture Syndrome)**
- *"Any joint pains, mouth sores, rash in sun exposed areas?"* **(Lupus Nephritis)**
- *"Any travelling to Egypt?"* **(Schistosomiasis)**
- *"Any sore throat?"* **(IgA nephropathy)**
- *"Any history of bleeding disorder?"* **(Bleeding disorders like hemophilia)**
- *"Are you taking any blood thinning medications or any other drug?"* **(Warfarin, Cyclophosphamide)**
- *"Had you any trauma to your back, any vigorous exercise or having periods?"* **(Back trauma, vigorous exercise, menstruation)**

▶ INVESTIGATIONS

- Urine cytology
- X-Ray / USG / CT KUB
- Intravenous urography
- Cystoscopy

Discussion

- Presence of one or more RBCs /mm^3 in an unspun urine sample is abnormal. It results in a positive dipstick test for blood and should always be followed by urine microscopy to confirm presence of RBCs and to exclude haemoglobinuria or myoglobulinuria which may also give false-positive dipstick tests. The test is sometimes too sensitive, giving false-positive results in normal individuals. Microscopy may also demonstrate red cell casts which indicate bleeding from the kidney, particularly in glomerulonephritis.

Differential diagnosis

- **Painless or silent haematuria**
  - Carcinoma of bladder or kidneys (intermittent bleeding should not be missed)
  - Glomerulonephritis
  - Polycystic disease / renal cysts (single or multiple)
  - Sickle cell disease
  - Hydronephrosis
- **Haematuria accompanied by excruciating pain**
  - ***Renal colic:*** Passage of a ureteral calculus
  - ***Clot colic:*** Passage of a blood clot from renal bleeding
- **Intermittent recurrent haematuria**
  - IgA nephropathy
- **Haematuria with dysuria**
  - Bladder infections or stones
- **Trauma**
- **Tuberculosis**
- **Papillary necrosis**
- **Infarction**
- **Tubulointerstial nephritis**
- **Coagulation defects**

40. Tiredness with daytime sleepiness

Your role: You are the doctor in a general medical clinic

Patient: Mr. Shah Khalid, aged 45

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 45-year-old male have 01-year history of tiredness. He is regularly found at work asleep at his desk. He also fell asleep at the wheel of car 5 weeks ago. He is hypertensive and overweight with 110 kg.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of lethargy

- **Duration:** *"Since how long the lethargy has been present?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is? ... Does it affect your daily chores of life?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes it better?"*
- **Associations (D/D):**
  - *"Do you snore loudly? ...... Does the breathing stop and starts repeatedly during sleep? ...... Any morning headaches? ... Or daytime sleepiness like falling asleep at work, in front of the television and whilst driving? ...... What is the size of your neck collar and weight?"* **(Obstructive sleep apnea)**
  - *"How is your sleep quality? ...... Do you wake up for passing your water works at night? ... How many times? ...... Any restless at night?"* **(Poor sleep quality)**
  - *"Do you have any cold intolerance or preference for warm environment? ...... Any weight gain despite of normal eating?"* **(Hypothyroidism)**
  - *"Is tiredness worse with activity and better during rest?"* **(Myasthenia gravis)**
  - *"Any anxiety, stress, depression, marital strife with poor sleep?"* **(Depression)**
  - *"Do you take any sleeping pills or alcohol before sleeping?"* **(Drugs)**

▶ INVESTIGATIONS

- Base line investigations
- Thyroid function tests
- **Epworth Sleepiness Scale:** Score of >15 out of 24 is suggestive of OSA.
  "Do you fell asleep while ...?
  - *Sitting in a place of activity (work)?*
  - *Sitting and talking to someone?*
  - *Sitting quietly after lunch (without alcohol)?*
  - *Lying down to rest in the afternoon?*
  - *Sitting and reading?*

  - *Watching television?*
  - *Passenger in a car for 1h?*
  - *Sitting in the car when stopped?"*

  High chance of dozing =3 · Moderate chance of dozing =2 · Slight chance of dozing =1 ·No chance of dozing =0
- **Sleep studies (polysomnography):** These studies differ in various laboratories but mostly have pulse oximetry, heart rate monitoring (reflect arousals during sleep); videoing, EEG traces and a microphone to detect levels of snoring during the night. May include recording of thoracoabdominal movements to detect any paradox (excessive movements as a consequence of airway obstruction).

▶ MANAGEMENT

- Nasal CPAP
- Informing DVLA

41. Tremors

Your role: You are the doctor in a neurology clinic

Patient: Mr. Waseem Akhtar, 70 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 70-year-old male have recent history of shaking of hands and dropping the things. He had TIA 05 years ago for which he is taking aspirin.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of tremors

- **Duration:** *"Since how long you have the shaking of hands?"*
- **Onset:** *"From where it started first? ... Is it confined to the hands, arms or both? ... Is it in both the hands or one hand only? ... In which hand or arm it is worse? ... Are you left- or right-handed?"*
- **Progression:** *"Is it worsening with time? ... Slowly or quickly?"*
- **Severity:** *"How bad it is? ...... Do you have shaking anywhere else like head, jaw or feet?"*
- **Associations (D/D):**
  - *"When you get shaking of your hands? ...... Are they present at rest, or appears on reaching a target, or holding your arms out? ...... Do they attenuate or worsen during activity?"*
  - ***Resting tremors (Parkinson's & Parkinson plus):*** *resting tremors +*
    - *"Any rigidity, slowness of movements (bradykinesia), inability to roll over in bed, dribbling of saliva, loss of memory?"*
  - ***Intentional tremors (cerebellar):*** *tremors on reaching a target +*
    - *"Any difficultly in speech or swallowing? ...... Issue with balance or spinning of room? ...... Any weakness or numbness of limbs? ...... Any headache?"* ***(posterior circulation stroke, tumours, MS, Friedrich ataxia)***
  - ***Benign essential tremors:*** *Absent at rest, appears on holding arms out with worsening during activity?*
  - ***Physiological tremors (Anxiety, thyrotoxicosis):*** *Absent at rest, appears on holding arms out with attenuation during action?*
  - ***Chorea:*** *fleeting, purposeless, restless and fidgety*
  - ***Drug:*** *B-agonist inhalers, theophylline, cyclosporine*
  - ***Alcohol***

▶ MANAGEMENT

- Reassurance
- B-blockers

42. Visual disturbances

Your role: You are the doctor in a diabetes clinic

Patient: Mr. Noman Akbar, aged 80

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 80-year-old man with history of migraine, DM, hypertension, MI, stroke and right carotid artery stenosis have episodes of zig-zag vision lasting for up to an hour.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of visual problem

- *"What exactly the problem is?"*
- *"In which eye? ... One or both eyes?*
- *"Which area of the visual field is affected?"*
- *"Any associated redness, watery discharge or pain?"*

- **Duration:** *"Since how long you are having these episodes? ... What is length of each episode?"*
- **Onset:** *"Do they start abruptly with sudden resolution?"*
- **Progression:** *"Is it getting worse with increasing episodes?"*
- **Associations (D/D):** *"Any other problem with your eyes?"*
  - ***CNS:***
    - TIA: carotid artery stenosis, AF
    - Migraine
    - BIH
    - Tumours
  - ***Eye:***
    - **Glaucoma**
      - Open angle glaucoma: Painless visual field loss
      - Close angle glaucoma: Painful red eye
  - ***Retinal:***
    - Macular degeneration: Painless bilateral loss of visual acuity.... *"Can you read newspaper print?"*
    - Vitreous haemorrhage
    - Retinal detachment
    - Retinopathy
    - Optic atrophy: ethambutol
    - Retinitis pigmentosa: progressive night-time blindness
  - ***Hypoglycaemia:***

Details of DM, stroke, MI

- **DOP SAREA**

Risk factors evaluation

- Smoking
- Alcohol
- Cholesterol levels

INVESTIGATIONS

- Retinal screening and full retinal examination: Urgent referral to ophthalmologist
- MRI with MRA brain
- Carotid Doppler USG
- ECG
- 24-h ECG recording

Diabetic retinopathy

- **Non-proliferative diabetic retinopathy (NPDR):** Present in all diabetics at 20 years (in type 1 DM at 5 years 25%, at 15 years 80%).
- **Clinically significant macular oedema (CSMO):** At 3 years 25% chances of moderate visual loss with CSMO. CSMO may appear even in NPDR. CSMO can be detected using fluorescein angiography.
- **Proliferative diabetic retinopathy (PDR):** Retinal hypoxia triggers new blood vessels formation at the optic disc, macula or elsewhere on the retina. Immature newly formed blood vessels easily rupture resulting in vitreous haemorrhage, retinal detachment and fibrosis. Types of PDR are NVD (neovascularization at disc) and NVE (neovascularization elsewhere). If there is severe NPDR, the chances of developing PDR are increase within next five years.

Control of diabetes and hypertension at safe level should be made rather than trying to meet unrealistic targets with complications of hypoglycaemia or postural hypotension. Calcium channel antagonists and low-dose thiazides have been shown to prevent CVA but for diabetic patient ACEI should also be considered.

43. Vomiting

Your role: You are the doctor in a respiratory clinic

Patient: Mr. Abdullah Shah, 24 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 24-year-old man have vomiting started 02 weeks ago after commencing ATT.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of vomiting

- *"What is the content of vomiting? ... What is its colour? ... Any blood in it?"*

- **Duration:** *"Since how long you have nausea and vomiting? ... Did it start after commencement of anti-tuberculous treatment?"*
- **Progression:** *"Is it gradually worsening?"*
- **Severity:** *"How often is the vomiting in a day? ... Do you have nausea when not vomiting?"*
- **Aggravating factors:** *"What makes it worse? ... Any relation to meals?"*
- **Relieving factors:** *"What makes it better?"*
- **Associations (D/D)**
  - ***GIT:***
    - AVH
    - Pyloric outlet obstruction / intestinal obstruction
    - Achalasia
    - Acute gastritis / enteric fever
    - Oesophagitis
    - Pancreatitis /gall stones
  - ***CNS:*** cerebellar disorder, raised ICP, SOL, infections
  - ***ENT:*** BPPV, Ménière's' disease, labyrinthitis
  - **Eyes:** glaucoma
  - ***Addison's disease***
  - ***Drug induced:*** ATT (is the patient taking correct dose as per his body weight), antidepressants, opioids, antibiotics, dextropropoxyphene

ATT induced hepatitis

- Modest elevations are common. If levels of ALT and AST rise above five times normal or the bilirubin level is elevated, then the medication must be stopped, and smaller doses reintroduced individually once the levels have normalized.

British Thoracic Society's guidelines on ATT induced hepatitis

- Once LFTs are normal, sequentially reintroduce the drugs in the order of isoniazid, rifampicin, pyrazinamide while monitoring both clinically and with LFTs.

INH

Start with 50 mg/day, if no reaction sequentially increase every 2-3 days to 300 mg/day

If no reaction add after further 2–3 days

⇓

Rifampicin

Start with 75 mg/day, if no reaction sequentially increase every 2-3 days to 300 mg/day and then to 450 mg (if <50kg) or 600 mg (if >50kg) after a further 2–3 days

If no reaction aadd

⇓

Pyrazinamide

Start with 250 mg/day, if no reaction sequentially increase after every 2–3 days to 1 g and then 1.5g (for <50 kg body weight) or 2 g (>50kg).

44. Weakness of the right arm

Your role: You are the doctor in a general medical clinic

Patient: Mr. Latif Sahi, 74 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 74-year-old man have history of recurrent episodes of inability to move his right arm.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness of right arm

"Where exactly the weakness is? ..."

- *"Which part of the arm first became weak? ... Does it spread to the rest of the limb? ...... Do you have weakness in your shoulder with difficulty in raising your arms above your head like combing together with weakness in you hip with difficulty in raising from chair; or weakness in your hand with weak grip together with weakness in your foot with difficulty in walking; or both?"* ***(Proximal or distal or both)***
- *"Do you have weakness anywhere else?"*

- **Duration:** *"Since how long you are having these episodes? ... What is length of each episode?"*
- **Onset:** *"Do they start abruptly or gradually? ...... How they resolve?"*
- **Progression:** *"Is it getting worse with increasing episodes?"*
- **Severity:** *"How many times you had the weakness? ...... Do you have any disability due to the recurrent episodes like lifting cups, doing up buttons or writing? ...... Are you left- or right-handed?"*
- **Associations (D/D):**
  - ***TIA / stroke:***
    - *"Any headache, visual problem, difficulty in speaking or swallowing, loss of consciousness, any problem with the balance?"*
    - *"Any neck pain?" (carotid artery dissection)*

    Look for AF, infective endocarditis, LVF, blood clots in blood channels of legs
  - ***MS***
  - ***Migraine***
  - ***Epilepsy:*** Todd's paresis
  - ***SOL Brain***
  - ***Hysterical***
- **Daily chores of life:** *"What about your daily chores of life? ...... Do you have to climb stairs to walk to your house? ...... How you use toilet? ...... How does cooking for you?"*

Risk factors

- DM
- Hypertension

- Fat levels (Hypercholesterolemia)
- Family history
- IHD
- Smoking, alcohol

INVESTIGATIONS

- CT scan brain
- Carotid Doppler USG
- ECG
- 24-h ECG recording
- Echocardiography

MANAGEMENT

- Carotid surgery if significant carotid artery stenosis
- Life-long anticoagulation
    - ***CHADS-2 VASC score***

      There is 30% risk of stroke with AF in the elderly. Patients with high score should be anti-coagulated while with lower score to be treated with aspirin. Risk of hemorrhage is increased if INR above the recommended level of 2.1-3.0.

45. Weight gain

Your role: You are the doctor in an endocrine clinic

Patient: Mrs. Parwasha Fatima, aged 40

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 40-year-old lady with poorly controlled T2DM over last 06 months, have weight gain for the last 01 year.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of weight gain

- *"Where exactly you are putting weight in your body?'* **(Distribution of fat)**
- **Duration:** *"Since how long your weight is increasing?"*
- **Progression:** *"Is it worsening with time? ... Is there any change in your appetite?"*
- **Severity:** *"How much weight you have gained? ... What was your previous weight?"*
- **Associations (D/D):**
  - ***Glands:***
    - *"Do you have any intolerance to cold or preference to warm environment; constipation; any change in voice or hoarseness; dryness and roughening of skin; tingling, numbness of hands or feet; thyroid surgery, radiation to the neck; any difficult delivery or childbirth within the last 6 months; any excessive menstrual bleeding?"* ***(Hypothyroidism)***
    - *"Do you have any skin changes like thinning, striae or bruising; hair growth/acne; difficulty in climbing stairs or standing up from a sitting position; irregular or missed menstrual periods, poor libido; hypertension, worsening diabetes; bony fractures?"* ***(Cushing's)***
    - *"Any progressive enlargement of body parts with increase in ring or hat size?"* ***(Acromegaly)***
  - ***Excessive diet, lack of exercise, alcohol***
  - ***Drugs:*** Insulin, sulfonylurea, OCPs, steroids, antipsychotics

▶ INVESTIGATIONS (CUSHING'S)

Screening test (1st line) (1st visit)	• **24 hours urinary free cortisol (↑)** • **Overnight dexamethasone suppression test (No suppression)** 1 mg PO at 11 PM, Cortisol 9 AM (Normally cortisol is almost totally suppressed < 100 neoliberals/ L)
	Cushing's syndrome due to any cause ⇓

Screening test (2nd line) (2nd visit)	• **Check cortisol circadian rhythm by morning and midnight cortisol – lost (High midnight cortisol)** Cortisol midnight (12 PM): 8 AM (only for indoor patients) • **Low dose dexamethasone suppression test (No suppression)** 0.5 mg PO 6 hourly X 02 days, cortisol 9 AM (0, 2 days)
⇙ Cortisol suppression **Psuedo-cushing**	**Cushing's synd due to any cause CONFIRMED** ⇓

ACTH Levels

⇙	⇘
ACTH Undetectable	↑ ACTH
⇓	⇓
For Adrenal cause › USG or CT scan Adrenals › Adrenal vein sampling	**High dose 48 hours dexamethasone suppression test** 2 mg PO 6 hourly X 02 days, cortisol 9 AM (0, 2 days)
⇙ Cortisol Suppressed to <50%	⇘ Cortisol **NOT** Suppressed to <50%
For Cushing's Disease (Pituitary)	**For Ectopic ACTH**
⇓	⇓
• MRI Pituitary • Inferior petrosal sinus sampling	• CXR / CT Chest • CT Abdomen (Ca Pancreas) • Tumor markers

Note: Dexamethasone, but not other steroids like prednisolone, is used in suppression test because it does not have cross reactivity during radioimmunoassay testing for cortisol. Albeit, other steroids may have cross reactivity.

▶ MANAGEMENT

	↱	**Trans-sphenoidal Surgery** (microadenoma) Remission rate 80% for micro-adenomas but <50% for macro-adenomas. Postoperatively many patients have adrenal insufficiency that may last for 12 months requiring cortisol replacement in low-dose. Biochemical recurrence occurs in approximately 5%.
	↱	**Pituitary irradiation**
• **Cushing's Disease (Pituitary)**	→	**Bilateral adrenalectomy** (not done now) → ACTH ↑↑↑ → Nelson's syndrome ↑ size of pituitary
	↳	**Adrenolytic drugs** (Mitotane / Metyrapone)

• **Adrenal tumor**	↗ ↘	**Adrenalectomy** **Adrenolytic drugs** (Mitotane / Metyrapone)
• **Ectopic**	→	**Treat primary**

Ketoconazole is an effective agent for control of cortisol synthesis prior to surgery.

46. Weight loss

Your role: You are the doctor in a general medical clinic

Patient: Mrs. Memoona Rashid, 40 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 40-year-old lady with a 5 kg weight loss over last 6 months and increased bowel activity last few weeks.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Associations (D/D):**
  - ***Non-gastrointestinal:***
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***Diabetes mellitus:*** *"Any increased frequency of water works or increased thirst?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood?"*
    - ***Adrenal insufficiency:*** *"Any weakness or dizziness?"*
    - ***Intentional:*** *"Any dieting?" (Dieting/diet pills, exercise, laxatives/diuretics, amphetamines, orlistat, fenfluramine, and thyroxine)*
    - ***Anxiety neurosis / depression:*** *"Any stress at job, home or marital conflict?"*
    - ***Smoking:*** *smoking reduces appetite*
  - ***Gastrointestinal:***
    - *"Is there any change in your appetite?"*
    - ***Primary neoplasm:*** *"Any difficultly in swallowing, tummy pain, nausea / vomiting, any blood in vomiting or bowel works, any altered bowel habit?"*
    - ***Malabsorption syndromes (coeliac disease, Crohn's disease):*** *"Any bulky, foul smelling and difficult to flush away bowel works, any diarrhoea?"*
    - ***Poor dietary intake:*** *due to alcoholism or functional dyspepsia/peptic ulcer*

▶ INVESTIGATIONS

- TFTs
- CXR
- FBC, LFT, U&E, GGT, BSR
- USG abdomen

47. Weight loss and chronic diarrhoea

Your role: You are the doctor in a gastroenterology clinic

Patient: Mr. Perveiz Rasul, aged 23

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 23-year-old man complaints of weight loss and chronic diarrhea.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of weight loss

  - *"Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
  - *"How much weight you have lost? ...... What was your previous weight? ...... The time during which you lost the weight?"*
  - *"Is there any change in your appetite?"*
- **Associations (D/D):** as discussed in previous section

Details of diarrhoea

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How often you have bowel movements in a day? ...... Is it large volume or small volume?"*
- **Aggravating factors:** *"What makes it worse? ...... Any relation to meals?"*
- **Relieving factors:** *"What makes it better?"*
- **Associations (D/D)**
  - *"Does it contain any undigested food? ...... Can you tell me about its colour? ...... Did you see any blood on stools or on the paper? ... Was it bright red or black motion? ... Was it coating the stools or was mixed in the stools? ... Any mucus or slime in it?"*
  - *"Do you have to get up at night to pass the motion?"*
  - *"Any pain at the back passage?"* **(rectal pain)**
  - *"Do you feel incomplete evacuation of the bowels?"* **(tenesmus)**
  - *"Urgency?"*
  - *"Incontinence?"*
  - ***Malabsorption syndromes:***
    - *"Any bulky, foul smelling and difficult to flush away bowel works? ...... Any itchy skin rash or association with cereals, wheat, rye and barley? ...... Any sores in the mouth?"* ***(celiac disease, bacterial overgrowth, chronic pancreatitis, crohn's disease, ileocecal TB)***
  - ***Infective:***
    - Bacterial (Shigella, Yersinia)
    - Protozoan (amoebic dysentery, Giardia, Cryptosporidia)
    - Tuberculosis

    - Parasitic (strongyloides)
    - Post-infective irritable bowel
  - ***Colonic neoplasm***
  - ***Antibiotic and laxative usage***
  - ***Previous GI surgery or radiation therapy***

▶ INVESTIGATIONS

- FBC, U&E, LFT
- Serum iron, folate, vitamin B12, calcium
- Anti-endomyseal antibody, anti-TTG antibody
- Upper GI endoscopy with duodenal biopsy
- Small bowel barium meal follow-through
- Stool samples for infective causes
- C-glycocholic acid breath test for bacterial overgrowth

48. Wheeze

Your role: You are the doctor in a respiratory clinic

Patient: Mr. Jamal Din, 30 years old

Each long case will be 25 minutes duration. You have 20 minutes in which you will take a history while observed by one examiner and will perform a focused and directed examination. A 10-minute time notification will be given. In the remaining 5 minutes, one examiner will ask you to report on any abnormal physical signs elicited, your diagnosis or differential diagnoses, investigations and your plan for management.

Referral text / Clinical problem:

This 30-year-old baker had childhood asthma out of which he grew well by the age of 9 years, but symptoms reappeared since leaving school. He has increasing chest tightness and wheeze for last 01 year.

Your task: to interview the patient and perform relevant clinical examination. You are not required to complete the history before performing appropriate examination. Inform the patient of about your probable diagnosis (or differential diagnoses) and, discuss your plan for investigations and treatment where appropriate. Answer directly to any specific questions which the patient may have.

▶ HISTORY (CHIEF COMPLAINTS)

Details of wheeze, cough, dyspnoea

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Progression:** *"Is it worsening with time?"* (the breathlessness is episodic during the initial few years appearing usually during the seasons of winter or spring, while remaining asymptomatic after the attacks. Progressively it may become persistent with occasional exacerbations)
- **Severity:** *"Do you have breathlessness on walking or even at rest? ...... How much distance can you walk on flat at normal pace before stopping? ... And before the illness? .... And how many flight of stairs can you walk up before stopping? .... And before the illness? ...... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse like cold, or dust or activity? ...... Any triggers such as viral illnesses, pollen, house dust mite, animal dander?"*
- **Relieving factors:** *"What makes you feel better?"*
- **Ever had it before:** Past history of allergy and atopy, e.g. asthma, allergic rhinitis, eczema.
- **Associations (D/D):**
  - ***COPD /Asthma:*** *"Do you have any wheeze or chest tightness during breathlessness? ...... Is it intermittent or progressive? ...... Do you have more breathlessness, wheeze and cough in the mornings; or there is no day to day variability? ...... Any allergy to common household allergens like pets, house dust mite, pollen and smoke?"*

  COPD: *Progressive symptoms without daily variation. Smoking history & age when started. Quantify by pack-years. Ask about number of exacerbations per year (increased breathlessness, increased sputum volume or purulent sputum), winter exacerbations, any worsening after coryzal illnesses.*

    - **Asthma:** intermittent symptoms with morning dipping, history of atopy/allergic rhinitis, eczema.
      - ***Allergic asthma:*** *"Any running nose or sneezing?"*
      - ***Occupational Asthma:*** *"Any exposure to isocyanates, platinum salts, hardening agents, soldering fluxes? Do you have symptoms while at work? Do they come on straight away or after a time lag during the day? What exactly is your job at work? (desk job, transportation or dough preparation/baking, cleaning solvents at work, working with varnishes, paints, adhesives containing isocyanates) ... How much exposure you get? Do the symptoms improve away from work like holidays?"*
  - ***Church-Strauss syndrome***

  - ***Extrinsic allergic alveolitis:*** *"Do you have any pets at home?"*
  - ***Foreign body***
  - ***Anaphylaxis***
  - ***CCF***

- *"Do you have a peak flow meter at home? ... What is your reading at home?"*
- *"Are you using any inhalers? ... How do you use them? ... How frequently you use salbutamol inhaler as rescue inhalation?"*
- *"Do you have any concerns like losing the job due to ill health?"*

Discussions

- Patients having pre-existing asthma are at more risk of developing the occupational asthma.
- Early diagnosis of occupational asthma is important as early removal of a sensitized worker from exposure improves the prognosis.
- Breathlessness developing on first exposure means that probably the material is a direct irritant. Symptomless period post-exposure favours occupational sensitization. Symptoms in baker usually develop for the first time more than 10 years after first exposure.
- To diagnose occupational asthma, serial peak flow measurements should be done both at work and at home every 2 hours, during weekends and during holidays.
- Address the concerns regarding changing the jobs and refer the patient to an occupational physician. Either the material causing occupational asthma should be substituted if possible or worker should be relocated within the workplace.
- Symptoms may take a long time to reverse and spirometry changes may persist.

C. Common Long Cases

1. Cardiology
2. Respiratory
3. Rheumatology
4. Endocrinology
5. Neurology

I. CARDIOLOGY

1. Infective endocarditis

HISTORY (CHIEF COMPLAINTS)

Details of chief complaints

DOP SAREA (malaise, fever, symptoms of anaemia)

Details of complaints suggesting embolic phenomena

DOP SAREA (stroke, chest pain; haematuria or loin pain)

Details of any recent invasive procedures

- Dental, endoscopic, urological or operative procedures
- **Use of antibiotics for prophylaxis** (either before an invasive procedure or for rheumatic fever, or both)

Details of risk factors

- Past history of IE / rheumatic fever
- Cardiac lesions
  - Damaged / prosthetic valves
  - Congenital heart disease
  - HOCM
- IV drug abuse (tricuspid and pulmonary valve infection)
- Immunosuppression (steroids, DM, alcohol, HIV)
- Haemodialysis

Details of results of investigations

- Blood cultures
- Echocardiography: TTE or TOE

Details of management since admission

- Antibiotics taken, treatment duration, any discussion regarding valve replacement

EXAMINATION

- **Hands:**
  - Clubbing
  - Osler's nodes **(painful & palpable lesions on the finger pulp due to embolic phenomenon)**
  - Janeway lesions **(non-tender erythematous maculopapular lesions on the palms, soles or pulps containing bacteria)**
  - Splinter haemorrhages
- **CVS:**
  - Valvotomy or operations scar
  - Murmurs
  - Prosthetic valve click
  - Signs of cardiac failure
- **Abdomen:**
  - Splenomegaly
- **CNS:**
  - CVA
- **Roth spots**
- **Joints**

Note: Peripheral signs of infective endocarditis are present in subacute IE but absent in acute IR.

Differential Diagnosis

- Atrial myxoma
- Occult malignant neoplasm

- SLE
- Polyarteritis nodosa
- Post-streptococcal glomerulonephritis
- Pyrexia of unknown origin
- Cardiac thrombus

DISCUSSION

▶ INVESTIGATIONS

- **Blood cultures:** at least 3 - 6 blood cultures over 24 hours. 98% of patients with positive culture have positive results in the 1st three bottles. **(Both aerobic and anaerobic, fungal cultures if required)**
- **Echocardiography:**
  - ***Vegetations:*** Vegetations have tendency to occur downstream of the abnormal jet, e.g. on the aortic surface of the aortic valve in cases of aortic stenosis. TTE detect vegetations > 2 mm. vegetations <2 mm can be detected with TOE.
  - ***Valvular regurgitation:*** by Colour Doppler

  TOE allows better detection of vegetations, valvular involvement and valve abscesses.
- **CBC & ESR:** Leucocytosis with neutrophilia, raised ESR (may be >100 mm/h), and a raised CRP level. CRP will settle down after treatment but ESR may remain high for months.
- **RFTs**
- **Chest X-ray:** LVH or RVH; increased pulmonary artery markings, Kerley's B lines, pulmonary edema and valve calcification (lateral film).
- **ECG:** AF, conduction defect
- **Serological tests:** Low C3, C4 and CH50 levels. RF is positive in 50% and ANA in 20%.

Organisms

Native valve endocarditis (NVE) ↗	**Normal valves (Acute)** • Staphylococcus • Group B streptococci
↘	**Abnormal valves (subacute: SBE)** • Streptococcus Viridans • Enterococcus faecalis • Streptococcus Bovis • HACEK gram negative coccobacilli
Prosthetic Valve Endocarditis (PVE) ↗	**Early PVE** Nosocomial (within 60 days) • CoNS (staph epidermis) • Non-HACEK gram -ve bacilli • Fungi (Candida)
↘	**Late PVE** (Community acquired organisms same as NVE) • Staphylococcus • Streptococcus Viridans • Enterococcus faecalis • Streptococcus Bovis • HACEK gram negative
IV Drug Abuse Endocarditis (IVDA)	• Staphylococcus aureus • Candida

Pacemaker IE	• Staphylococcus aureus
↗ **Nosocomial IE** 48 hours after admission or health care associated IE Organism both: Staph, CoNS epidermidis, enterococci	**Right sided variety** Valve injured by procedure
↘	**Left sided variety** Previously damaged heart valves

- **Causes of culture-negative endocarditis**
    - ***Non-infective endocarditis:*** Libmann Sac endocarditis (SLE), marantic endocarditis (malignancy)
    - ***Previous use of antibiotics***
    - ***Exotic organisms:*** Fastidious organism erroneously results in culture negative due to delay in growth

A	Aspergillus
B	Brucella
C	Coxiella burnetii / Chlamydia / candida
H	**HACEK** (**H**emophilus, **A**ctinobacillus, **C**ardiobacterium hominis, **E**ikonella species, **K**ingella kingae)

▶ DIAGNOSIS (DUKE'S CRITERIA)

Diagnosis is usually based on clinical assessment. The Duke criteria can be used to assist.
(2 major or 1 major and 2 minor, or 5 minor criteria)

Major:

- **Blood cultures:** Typical organism in 2 blood cultures
- **Echocardiography:** large vegetation*, abscess*, dehiscence*, new valvular regurgitation

Minor:

- Pyrexia ≥ 38°C
- Positive blood cultures not meeting the major criteria: atypical organism on blood culture
- Abnormal echocardiogram not meeting major criteria
- Predisposition to IE: cardiac lesions or intravenous drug abuse
- Embolic phenomena/ vascular signs
- Immunological signs (Osler's nodes, Roth spots, GN, rheumatoid factor)

▶ MANAGEMENT

Involve cardiac surgeon early in the management, particularly for staphylococcal infection.

- **Antibiotics:** For prosthetic valves, 6-8 weeks
    - ***Empirical therapy***
        - IV Flucloxacillin 2g 6 hourly + gentamicin 1 mg/kg 8 hourly
        - In acute cases add—Flucloxacillin 2g IV 6 hourly
    - ***Staphylococcal endocarditis (IVDUS)***
        - Flucloxacillin 2g IV 6 hourly + gentamicin **(1st choice)**
        - Vancomycin + gentamicin
    - ***Streptococcal endocarditis:*** For S. Viridans, 4-6 weeks.
        - Benzyl penicillin 1.2g QID + gentamicin 1 mg/kg IV TID
    - ***Enterococcus faecalis:*** treat for 4-6 weeks
        - Amoxicillin + gentamicin **(treatment of choice)**
        - Vancomycin + gentamicin **(In penicillin allergic patients)**

  - ***HACEK***
    - Ceftriaxone
- **Indications for surgery:**
  - Persistently positive blood cultures despite treatment
  - Resistant organisms (like fungi)
  - Valvular dysfunction causing moderate or severe cardiac failure
  - Aortic root or annular abscess, or new conduction defect on ECG
  - Recurrent major embolic phenomena
- **Indications for surgery in prosthetic valve endocarditis**
  - Early endocarditis in ≤ 1st two months after surgery
  - Valvular dysfunction causing moderate-to-severe cardiac failure
  - Annular or aortic root abscess or new cardiac conduction abnormalities on ECG
  - Persistence of fever ≥ 10 days despite appropriate antibiotics
  - Positive blood cultures for S. aureus or fungi

▶ PROPHYLAXIS (AHA guidelines)

Remember prophylaxis against rheumatic fever consists of long-term, low-dose antibiotic administration. While prophylaxis against endocarditis requires high-dose, short-term treatment only in patients with a very high risk.

- **High risk conditions:** Prophylaxis is recommended only in high risk cardiac conditions like
  - History of IE
  - Prosthetic cardiac valves
  - Congenital heart diseases:
    - Unrepaired including conduits and palliative shunts
    - Completely repaired with device or prosthetic material during the first 6 months post-procedure
    - Repaired but have residual defects inhibiting endothelialization
  - Cardiac transplant recipients with valvular heart disease
- **AHA Guidelines:**
  - **Procedures requiring IE prophylaxis:**
    - Dental procedures which involve manipulation of the periapical region of teeth or gingival tissue, or perforation of the oral mucosa
  - ***Procedures not requiring prophylaxis:***
    - Other dental procedures not involving manipulation of periapical region of teeth or gingival tissue, or perforation of oral mucosa
    - Genitourinary tract (obstetric / gynaecological / urological procedures, childbirth
    - Upper & lower GIT
    - Upper & lower respiratory tract (ear, nose and throat procedures & bronchoscopy)
- **Prophylaxis regimens**
  - **Dental procedures:** amoxycillin 2 g, 1 hour before the procedure. For patients unable to take oral antibiotics, use IV or IM ampicillin just before the procedure. If the risk is high, give ampicillin and gentamicin as described below. Give clindamycin 600 mg PO 1 hour prior to the procedure if allergic to penicillin.
  - **GIT or genitourinary procedures:** Prophylaxis not recommended.

Remember that the effectiveness is not proven for antibiotic prophylaxis. Patients need to be reminded of the need for good dental hygiene and regular dental review.

Don't offer chlorhexidine mouthwash for IE prophylaxis to those who are at risk of IE and are undergoing dental procedures.

PROGNOSIS

- Infective endocarditis was invariably fatal prior to antibiotic use, but currently >70% of patients with native valve endocarditis and 50% of those with prosthetic valve endocarditis survive. Intravenous drug users have a good prognosis.

Factors suggesting a poorer prognosis

- Shock
- Congestive cardiac failure
- Extreme age
- Delay in starting treatment
- Involvement of multiple valves or aortic valve
- Involvement of prosthetic valve
- Multiple organisms
- Culture-negative endocarditis
- Staphylococcal, Gram-negative and fungal infections

CARDIAC LESIONS PREDISPOSING TO IE

- The appearance of a new murmur or any change in an existing murmur should always alert the physician for infective endocarditis.
- The order of frequency of infective endocarditis in pre-existing cardiac lesions is:
    - ***Acquired valvular heart diseases:***
        - Prosthetic valve (mechanical)
        - MR, MS
        - AS, AR
        - Prosthetic valve (tissue)
        - Repaired mitral valve
        - MVP with MR
    - ***Structural congenital heart diseases:*** include surgically corrected conditions (excluding fully repaired PDA, fully repaired VSD or isolated ASD and closure devices which usually endothelialise).
        - Bicuspid aortic valve
        - PDA
        - VSD
        - Coarctation of the aorta
    - ***HOCM***
    - ***Valve replacement***
    - ***Previous infective endocarditis***

Remember: Coronary stents and pacemaker leads do not appear to involve any risk of endocarditis.

II. RESPIRATORY

1. Bronchial asthma

▶ HISTORY (CHIEF COMPLAINTS)

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse with time?"* (the breathlessness is episodic during the initial few years appearing usually during the seasons of winter or spring, while remaining asymptomatic after the attacks. Progressively it may become persistent with occasional exacerbations)
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? .... And before the illness? ...... How many flights of stairs can you walk up before stopping? ... And before your illness? ...... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse? ... Cold, dust or activity? ... Any triggers? .... like viral illnesses, pollen, house dust mite, animal dander, etc."*
- **Relieving factors:** *"What makes you feel better? ...... Is it relieved by rest?"*
- **Associations (D/D):**
    - ***If cough, sputum & wheeze:*** *"Do you have intermittent or progressive shortness of breath with cough and wheeze? .... Do you have more breathlessness, wheeze and cough in the mornings; or there is no day to day variability?"*
        - ***Asthma:*** *Intermittent symptoms with morning dipping, history of atopy/allergic rhinitis, eczema*
            - ***Allergic asthma:*** *"Any running nose or sneezing? ... Any allergy to common household allergens like pets, house dust mite, pollen and smoke?"*
            - ***Occupational Asthma:*** *"Any exposure to isocyanates, platinum salts, hardening agents, soldering fluxes? Do you have symptoms while at work? Do they come on straight away or after a time lag during the day? What exactly is your job at work? (desk job, transportation or dough preparation/baking, cleaning solvents at work, working with varnishes, paints, adhesives containing isocyanates) How much exposure you get? Do the symptoms improve away from work like holidays?"*
        - **COPD:** Progressive symptoms without daily variation. Smoking history & age when started. Quantify by pack-years. Ask about number of exacerbations per year (increased breathlessness, increased sputum volume or purulent sputum), winter exacerbations, any worsening after coryzal illnesses.
        - **Others:** Bronchiectasis, pneumonia, pleural effusion, pneumothorax, pulmonary embolism, pulmonary hypertension, ILD
    - **If no cough & sputum; wheeze (±):**
        - ***Cardiac:*** *"Any history of shortness of breath on lying flat or sudden awakening from sleep due to breathlessness?"* ***(orthopnoea or PND)***
    - ***Reflux esophagitis***

Details of cough

- *"Is it dry or are you bringing up any phlegm?"* (usually dry with scanty mucoid sputum occasionally)
- *"Any blood in phlegm?"*

- **Duration:** *"Since how long you have the cough?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? Does it persist throughout the day and night? Any hospitalisation?"*
- **Aggravating factors:** *"Does it worsen after exposure to cold or dust?"*

Details of chest tightness & wheeze

- **DOP SAREA**

Drug or Treatment history

▶ GENERAL EXAMINATION

- Nasal polyp
- Respiratory rate

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest shape:** Increased anteroposterior chest diameter
- Supraclavicular and suprasternal excavation; intercostal spaces indrawing; obvious accessory muscles

Palpation:

- **Trachea:** Central/deviated .... Towards which side? tracheal tug absent or present? cricosternal distance increased or normal?
- **Apex beat:** Not displaced (palpable in the left 5th ICS medial to the midclavicular line, approximately ___ cm away from midsternal line, normal in character)
- **Chest expansion:** Decreased

Percussion:

- **Percussion note:** Hyper-resonant bilaterally
- **Area of upper border of liver dullness:** In 5th ICS in the right midclavicular line

Auscultation:

- **Breath sound:** Vesicular breathing with prolonged expiration
- **Added sounds:** bilateral polyphonic high-pitched rhonchi, more marked during expiration
- **Vocal resonance:** Normal

FET (forced expiratory time): > 6 seconds (normal <6 seconds)

Examination of other systems

- No other abnormalities detected

"My diagnosis is bronchial asthma."

Differential Diagnosis (D/D)

- COPD
- Chung-Strauss syndrome
- ABPA
- Hypersensitivity pneumonitis

DISCUSSION

▶ DEFINITIONS

Bronchial asthma

- Chronic reversible airflow limitation due to hyper-responsive airways presenting with paroxysmal breathlessness, cough, wheeze and chest tightness.

Chronic bronchitis

- Chronic cough with excessive mucoid sputum production, which is not attributable to any other cause, present on most days for a minimum of three consecutive months in a year for a minimum of two successive years.

Cardiac asthma

- Sudden onset severe dyspnoea associated with productive cough with profuse mucoid sputum expectoration due to LVF. Chest auscultation reveals bibasal crepitations without any rhonchi or wheeze.

▶ INVESTIGATIONS

- **CBC**
- **CXR**

- **Lung function tests:**
  - ***Spirometry with reversibility test:***
    - Reduced FEV_1 & FVC, FEV_1/FVC <70
    - Post-bronchodilator reversibility: Increase in FEV_1 >15% (200 mL) post bronchodilator inhalation (12% as per Global Initiative for Asthma)
  - ***PEFR:*** Measure on awaking, prior to taking bronchodilators, at afternoon and at night before going to bed.
    - Diurnal variation of >20% on > 3 days / week for 2 weeks. (Morning dipping is > 20% drop in PEF in early morning observed if bronchial asthma uncontrolled)
    - Post-bronchodilator reversibility: >15%
  - ***Exercise test:*** >15% drop in FEV_1 after 6 minutes of exercise.
  - ***Diffusion capacity of lungs for Carbon monoxide (DLCO or TLCO):*** normal
- **Arterial blood gases (ABGs):** $\downarrow PaO_2$, $\uparrow$ or normal $PaCO_2$
- **Methacholine challenge test (Bronchoprovocation test):** Helpful if asthma is suspected clinically but spirometry is normal e.g., mild intermittent asthma, cough variant asthma, hyperresponsive airways in chronic bronchitis. >20% drop in FEV_1 shows airways hyperresponsiveness. The test can also be performed with hypertonic saline or histamine.
- **Skin prick (scratch or puncture) test**
- **Allergen nasal provocation tests:** for exclusion of associated allergic rhinitis.
- **Serum total IgE levels**
- **ECG:** look for P pulmonale or RVH for exclusion of cor pulmonale

TYPES

- **Intermittent asthma:** only have day time symptoms ≤ 2 times a week & nocturnal symptoms < 2 times a month. There are no symptoms in between the attacks, spirometry is normal & PEFR diurnal variation <20% during asymptomatic period.
- **Persistent asthma:** daytime symptoms > 2 times a week & nocturnal symptoms > 2 times a month.
  - ***Mild:*** Daytime symptoms > 2 times a week but not daily, nocturnal symptoms >2 times per month (3-4) and normal spirometry during asymptomatic period (FEV_1 > 80% of predicted value & PEFR diurnal variation 20-30%).
  - ***Moderate:*** Daytime symptoms daily, nocturnal symptoms > 1 times a week but not every night and abnormal spirometry in between the attacks (FEV_1 60–80% of predicted value & PEFR diurnal variation >30%).
  - ***Severe:*** Daytime symptoms persists almost throughout the day for ≥ 6 months, nocturnal symptoms almost every night, FEV_1 < 60% of predicted value and PEFR diurnal variation >30%.
- **Acute exacerbation:** it is the worsening of asthma symptoms of any class.
  - ***Mild:*** Dyspnoeic but able to complete a sentence in a single breath.
  - ***Moderate:*** Dyspnoeic and not able to complete a sentence in single breath.
  - ***Severe (severe acute asthma):*** Severe dyspnoea, only able to talk in words, restless or unconscious.
- **Special variants:**
  1. Seasonal
  2. Exercise induced
  3. Drug-induced
  4. Cough variant
  5. Occupational

Exercise-induced asthma

Drop in $FEV_1 \geq 10\%$ after exercise.

Triggered mainly by entry of cold dry air in the lungs during exercise which is further augmented by increased water loss from the respiratory mucosa due to increased ventilation.

Treatment:

- Use of SABA, sodium cromoglycate or nedocromil sodium immediately before exercise

- ICS BID for 8 - 12 weeks
- ICS + LABA if persistent symptoms and spirometry is abnormal
- Leukotriene receptor antagonist

Drug induced asthma

Causative drugs:

- Aspirin, β-blockers, NSAIDs

Treatment:

- Avoid offending drugs
- Use NSAIDs which are safe like paracetamol, etoricoxib, tramadol

Cough variant asthma (Eosinophilic bronchitis)

Type of asthma characterized by chronic dry cough only, mostly at night, without any airflow limitation (with or without sputum eosinophilia). It is common in young children. Chest auscultation may be normal without any rhonchi during the day. Cough may be worsened with exercise, on exposure to dust, strong fragrances or cold air. Bronchoprovocation test with methacholine is positive.

Diagnostic criteria:

- Persistent dry cough > 6 - 8 weeks duration
- Demonstration of bronchial hyper-responsiveness
- Absence of dyspnoea and wheeze

Treatment:

- Nedocromil sodium
- Treat allergic rhinitis, if present
- Treat GERD with PPI and/or gastric prokinetic agent
- Avoid any environmental triggers like cold, dust, fume, etc
- Avoid β-blocker, aspirin

Occupational asthma

Caused by allergens at workplace. Symptoms worsen on workdays and improves on holidays.

Risk of developing occupational asthma is increased in atopic individuals and smokers. Commonly encountered in worker of chemical industry (colour dying, printing, laboratory workers), cigarette manufacturers, cotton industry; grain handlers, farmers, poultry breeders; wood industry and bakers.

Diagnosis:

- 2 hourly serial PEFR measurement both at workplace and away from work during normal waking hours for at least 4 weeks including minimum of 03 periods away from workplace for at least 2 consecutive days (up to 10 days in severe cases).

Treatment:

- Avoid further exposure
- Use mask at workplace
- Commence step care asthma management if no response.

Intrinsic and extrinsic asthma

- ***Intrinsic asthma (late onset or non-atopic asthma):*** No triggering factor identified. Onset >30 years. Usually persistent and severe. Skin prick test -ve and serum IgE levels normal. Family history of asthma usually absent.
- ***Extrinsic asthma (early onset or atopic asthma):*** Triggers include pollens, dust, common house dust mite, animal dander etc. Onset in childhood with seasonal variations. Skin prick test usually +ve and ↑serum IgE levels. Family history of asthma usually present.

▶ ACUTE SEVERE ASTHMA

An asthma attack which is non-responsive to regular bronchodilators treatment. Earlier it was called status asthmaticus.

- Patient can't complete sentence in a single breath
- RR >25/minutes

- Pulse >110 / minutes
- PEFR 33 - 50% of predicted (< 200 L/min)

Note: 45% of patients with acute severe asthma have pulsus paradoxus.

Clinical features of life-threatening asthma

- Exhaustion, confusion or coma
- Bradycardia or hypotension or arrhythmia
- Cyanosis
- Feeble respiratory effort
- Silent chest
- PEFR <33% of predicted (< 100 L/min)
- ABGs:
  - $SpO_2 < 92\%$ or $PaO_2 < 8$ kPa (60 mm Hg) even with O_2
  - Normal or ↑PaCO2 (> 6 kPa) and ↓or falling pH

Near fatal asthma:

If $PaCO_2$ is raised, and/or mechanical ventilation is required, it is called near fatal asthma.

Treatment of acute severe bronchial asthma

- High flow O_2 40 - 60% (maintain SpO_2 >92%)
- Nebulization with salbutamol 5 mg / terbutaline 10 mg. Repeat 2 - 4 hourly.
  ± add nebulization with ipratropium bromide 0.5 mg.
- Hydrocortisone 200 mg IV QID during first 24 hours followed by prednisolone 60 mg OD continued for 2 weeks, and later tapered.
- If no relieve, give magnesium sulphate IVI 1.2-2 gm over 20 minutes or salbutamol IVI 3-20 ug/min or terbutaline IVI 1.5-5 ug/min.
- Consider aminophylline 5 mg/kg as loading dose over 20 min followed by continuous IVI at 1 mg/kg/hour.
- Correct fluid and electrolytes (Hypokalaemia may be caused by repeated use of salbutamol)
- If no response, shift the patient to ICU for mechanical ventilation.

Note: patient may also be nebulized with isotonic magnesium sulphate 2.5 mL.

Treatment monitoring

- PEFR every 15-30 minutes
- Pulse oximetry (keep SaO_2 >92%)
- Repeat ABGs
- CXR to exclude pneumothorax

Indications of mechanical ventilation

- Drowsiness, confusion, severe exhaustion, coma, respiratory arrest
- Worsening of ABGs despite maximum treatment
  - Falling PaO_2 (<8 kPa or <60 mm Hg)
  - Rising $PaCO_2$ (>6 kPa or >45 mm Hg)
  - Falling pH
  - SpO_2 <90% or Failure to maintain >92%

MANAGEMENT

Steps	PEFR	Management
Step 1. **Occasional symptom** (daytime symptoms < 1 time / week for 3 months & nocturnal symptoms <2 times /month)	100% predicted	Inhaled short acting β_2 agonist (SABA) PRN. If used > 1 time /day, move to step 2
Step 2. **Daily symptom or** • Asthma exacerbation during last 2 years • Use of inhaled β_2 agonist ≥ 3 times in a week • Symptoms ≥ 3 times in a week • Nocturnal symptoms 1 per week	≤80% predicted	Add any of the following - • Low dose ICS [start 400 µg/day beclomethasone or equivalent (fluticasone, budesonide, , ciclesonide) & increase up to 800 µg/day if required] • Leukotriene receptor antagonist (LTRA), theophylline or sodium cromoglicate (less effective)

		• If no response, move to step 3
Step 3. Symptoms poorly controlled or severe symptoms despite regular ICS use	50 - 80% predicted	Add any one of the following (add on therapy) - • Low dose ICS + long acting β_2 agonist (LABA) like salmeterol, formoterol, etc. • Low dose ICS + LTRA • Low dose ICS + sustained release theophylline • Medium or high dose ICS If not controlled, move to step 4
Step 4. Symptoms poorly controlled or severe symptoms despite high dose ICS use	50 - 80% predicted	High dose ICS, up to 2000 μg/ day PLUS one of the following – • regular LABA • either LTRA or modified release theophylline or β_2 agonist
Step 5. Severe worsening symptoms	$\leq$ 50% predicted	Regular oral corticosteroid – add prednisolone 40 mg daily to step 4 and or Anti-IgE treatment
Step 6. Severe worsening symptoms despite use of prednisolone	$\leq$ 30% predicted	Hospital admission

Discharge criteria

- Stable on discharge medication
- No requirement for nebulization during at least last 24 hours
- PEFR 75% of predicted or personal best

Step down criteria

If symptoms adequately controlled, reduce the dose of ICS by 25-50% at every 3 monthly.

Steroid sparing drugs

- Methotrexate
- Cyclosporine
- Intravenous immunoglobulin
- Etanercept
- Anti-IgE monoclonal antibody (omalizumab)

New therapy for bronchial asthma

- **Omalizumab:** a monoclonal antibody directed against IgE, given every 2-4-week subcutaneously
- **Bronchoplasty:** by placing a stent to dilate constricted bronchi
- **Bronchothermoplasty:** thermal coagulation is used to reduce the hyperplastic smooth muscles in bronchi.

Rescue therapy

A short course of oral corticosteroids given for control of severe asthma or to overcome loss of asthma control at any step. Give prednisolone PO 30-60 mg once OD as a single morning dose or two divided doses for 3-14 days. Tapering is not required, if duration of treatment is < 3 weeks.

Home management of acute severe asthma (rule of 5)

- Take 5 puffs (1 puff and 5 sucks) of bronchodilator inhaler at 5 minutes interval with a large volume spacer ...... up to 5 times (25 puffs) within 1 hour. If no response, report to the nearest hospital.
- If there is no spacer, take the puffs as mentioned above but hold breath for 5 seconds after each puff.

Refractory asthma

Persistent asthma symptoms despite high treatment doses with frequent exacerbation.

- **Management:**
  - Regular home nebulization or as required
  - Vaccination against influenza, pneumococcal
  - Anti-IgE antibody (omalizumab)
  - Disease modifying agents: methotrexate, cyclosporine
  - Identifying pitfalls of management

Brittle asthma

Asthma with recurrent life-threatening attacks developing with no or little warning symptoms within minutes or hours. In between the attacks, the asthma may be well controlled.

- **Management:**
    - Advise to keep:
        - Emergency medicines at residence, during travelling and at workplace.
        - O_2 & resuscitation equipment at residence and at workplace.
        - Nebulized β_2 agonists at residence and at workplace.
        - Self-injectable epinephrine at residence, at workplace and should be carried at all the times.
    - Prednisolone 60 mg
    - Medic Alert bracelet
    - Advise to immediately reach the nearest possible hospital once wheezing appear. Patient may require direct ICU admission.

▶ ASTHMA AND MEDICAL CONDITIONS

Asthma with DM

- Regular blood sugar monitoring if corticosteroids are being used.
- Avoid metformin in uncontrolled asthma. The drug is contraindicated in acute severe asthma.
- Adjust dose of oral hypoglycemic agents to avoid hypoglycemia if aminophylline is used.

Asthma in Pregnancy

- 1/3rd worsen, 1/3rd improve & 1/3rd remain stable.

- **Uncontrolled asthma complications:**
    - ***Maternal:*** PIH, pre-eclampsia, hyperemesis gravidarum, vaginal haemorrhage, complicated labor
    - ***Fetal:*** low birth weight, IUGR, preterm baby, ↑perinatal mortality, hypoxia
- **Management during pregnancy:**
    - Safe drugs: All inhalers, SABA, LABA, ICS, theophylline, prednisolone, LTRA, cromoglycate.
- **Management during labor:**
    - Switch to hydrocortisone IV 100 mg TID/QID, if taking prednisolone >7.5 mg/day for >2 weeks before delivery.

Note: Acute severe asthma is rare during delivery which might be because of ↑endogenous steroids. Prostaglandin $F_{2\alpha}$ may cause bronchospasm and need extreme vigilance if used.

- **Breastfeeding:** *should be continued. Excretion of theophylline in breast milk is only <1%.*

Asthma with Hypertension

- Avoid non-selective β-blockers (use cardioselective β-blockers if compelling indication)
- Calcium channel blocker or ARBs: Drug of choice (avoid ACEI due to ↑risk of cough onset)

Asthma with Arrhythmia

- Amiodarone or digoxin can be used but avoid theophylline or aminophylline.

Asthma with Pain

- Avoid NSAIDs like aspirin, diclofenac

Asthma with Heart Failure

- ACE inhibitors should be continued, if tolerated.
- Carvedilol in small dose may be used.

Asthma with ischaemic heart disease

- Nitrates, CCB (diltiazem & verapamil) are drugs of choice.
- Clopidogrel is favoured over aspirin as the later may trigger or exacerbate asthma.
- Cardioselective β-blockers may be used.

▶ DIFFERENCES BETWEEN BRONCHIAL ASTHMA & COPD

Reversibility test: Limitation of airflow in bronchial asthma (except severe persistent asthma) is fully reversible after taking bronchodilators with FEV_1↑ >15% or 200 mL. However, in COPD, it is not fully reversible and FEV_1 ↑ is < 15%.

Parameter	COPD	Bronchial asthma
Onset	After 40 years	At any age
History of Smoking	>20 pack years	No association with smoking
Atopy	Rare	Common
Family history	-	Usually present
Clinical features	Productive cough & dyspnea	Wheeze, cough, chest tightness, dyspnea & cough
Sputum	Often profuse	Uncommon
Symptom free intervals	chronic and progressive disease with no symptom free intervals	Symptoms free periods between recurrent attacks, except in chronic persistent asthma.
Dyspnea	Progressive dyspnea with exacerbations	Intermittent dyspnea varying from day to day with early morning dipping
Spirometry	Airflow limitation not fully reversible post-bronchodilator	Fully reversible airflow limitation post-bronchodilator
Diurnal variation of PEFR	Less	More

▶ DIFFERENCES BETWEEN BRONCHIAL ASTHMA AND CARDIAC ASTHMA

Features	Cardiac Asthma	Bronchial Asthma
History	• Hypertension, IHD, valvular disease	• Past history of asthma attacks, atopy or allergic rhinitis
Age	• >50 years usually	• Usually young, but not age bound
Symptoms	• Cough with pink frothy sputum or sputum mixed with blood • Wheeze - rare	• Dyspnea • Cough with little mucoid sputum • Wheeze – common
Signs	• Pulse: pulse alternans • BP: high (if hypertensive) • Heart: ○ Cardiomegaly (apex beat displaced) ○ Gallop rhythm • Lungs: ○ Bibasal crepitations ○ No or little rhonchi	• Pulse: Pulsus paradoxus • BP: Normal, low in severe case • Heart ○ Absent ○ No • Lungs: ○ Plenty of rhonchi all over the lungs ○ No or little crepitations
CXR	• Bat's wing appearance due to pulmonary edema • ↑cardiothoracic ratio	• Clear
ECG	• LVH, MI, Arrhythmia	• Normal

▶ DIFFERENCES BETWEEN WHEEZE AND STRIDOR

- **Stridor:** Loud high-pitched musical sounds produced by partial obstruction of major airways including larynx, trachea or large bronchi. Stridor may be heard both in inspiration and expiration.

  - ***Causes:*** foreign body in major airways, tumors / laryngeal edema, recurrent laryngeal nerve palsy, infections (epiglottitis, laryngitis); bronchial obstruction due to enlarged paratracheal or subcarinal lymph nodes; laryngismus stridulus in tetany.
- **Wheezes:** Loud musical sounds heard from a distance produced by obstruction of smaller airways. Obstruction of smaller bronchi produce high pitched wheezes while obstruction of larger bronchi produce low-pitched wheezes. Wheezes are heard both during expiration and inspiration but more pronounced during expiration.
  - ***Causes:*** bronchial asthma, chronic bronchitis or COPD or airways obstruction by a foreign body or tumor

2. Chronic bronchitis

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough?"*
- **Onset:** *"How it started?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? …… At what time of the day it is more marked?* (more marked in the morning) *Does it persist throughout the day? …… Does it also affect your sleep? …… How much phlegm you are coughing up?* **(Quantify)** *… How the phlegm looks like?"* (Profuse expectoration of mucoid sputum)
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of tightness in the chest

  - *Do you feel tightness over the chest? … Does it aggravate on coughing?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? … How much distance can you walk on flat at normal pace before stopping? … And before your illness? ……. How many flight of stairs can you walk up before stopping? … And before your illness? ………. Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better? … Is it relieved by rest?"*
- **Ever had it before:** *"Have you ever had it before? … Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***COPD:*** *"Do you smoke?"* *(smoking history)*
  - ***LVF:*** *"Any chest pain, breathlessness on lying flat* (orthopnoea), *night-time awakening due to breathlessness, or swelling of the ankles?"*
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*

Drug or Treatment history

▶ GENERAL EXAMINATION

- As per findings (Must have a look at the bedside for sputum pot)

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest shape:** Normal
- **Chest movement:** Bilaterally restricted
- **Intercostal spaces:** appears full

Palpation:

- **Trachea:** Central
- **Apex beat:** Not displaced (palpable in the left 5th ICS in the midclavicular line, normal in character)
- **Chest expansion:** Decreased

Percussion:

- **Percussion note:** Normal bilaterally

- **Area of upper border of liver dullness:** In the 5th ICS in the right midclavicular line
- **Area of cardiac dullness:** Impaired

Auscultation:

- **Breath sounds:** Vesicular breathing with prolonged expiration
- **Added sounds:** bilateral plenty of rhonchi, present in both inspiration and expiration
- **Vocal resonance:** Normal

FET (forced expiratory time): >6 seconds (normal <6 seconds)

Examination of other systems

- No other abnormalities detected

"My diagnosis is chronic bronchitis."

Differential diagnoses

- COPD
- Chronic persistent bronchial asthma
- Emphysema
- Bilateral extensive bronchiectasis

DISCUSSION

DEFINITIONS

Chronic bronchitis

- Chronic cough with excessive mucoid sputum production, which is not attributable to any other cause, present on most days for a minimum of three consecutive months in a year for a minimum of two successive years.

COPD

- There is breathlessness which is progressive and not fully reversible

INVESTIGATIONS

- **CBC**
- **CXR:** no significant abnormality
- **ECG:** usually normal. In cor-pulmonale, there may be features of RVH
- **Lung function tests:**
  - ***Spirometry:***
    - ↓FEV_1 & FVC; FEV_1: FVC <70
    - ↑residual volume (RV), ↑total lung capacity (TLC), normal or mildly reduced gas transfer factor
  - ***PEFR:*** reduced
- **ABGs:** PaO_2↓, $PaCO_2$↑ or normal, pH <7.35
- **HRCT chest in some cases**

CAUSES OF CHRONIC BRONCHITIS

- **Smoking**
- Exposure to dust, fume, foggy environment (may be occupational)
- **Infection** (H. influenzae, Streptococcus pneumoniae, Moraxella catarrhalis)

CLINICAL PRESENTATION

- Cough with mucoid or mucopurulent sputum, more noticeable in the mornings, on cold exposure and during winters.
- Chest tightness, and exertional breathlessness.
- Cyanosis and edema (blue bloater)
- Pulmonary hypertension and cor pulmonale in advanced stages.

▶ COMPLICATIONS

- Type 1 & type 2 Respiratory failure
- Cor pulmonale
- Secondary polycythaemia
- Pulmonary hypertension
- Emphysema
- Secondary infection

▶ MANAGEMENT

- Smoking cessation
- Avoid air pollution (dust, fumes)
- Control of infection with appropriate antibiotic
- **Bronchodilator:**
  - ***Inhaled short acting β_2 agonist:*** Salbutamol (200 µg 4 - 6 hourly), terbutaline
  - ***Inhaled antimuscarinic:*** ipratropium bromide (40 µg 4 hourly), tiotropium (18 µg daily), oxitropium (200 µg BD)
  - ***Inhaled long acting β_2 agonist:*** salmeterol, formoterol
  - ***Oral theophylline***
- **Inhaled corticosteroid:** Beclomethasone (400 µg BD) or budesonide or fluticasone. Oral prednisolone, in severe cases, 30 mg for 2 weeks followed by maintenance dose.
- **Mucolytic agents:** bromhexine or N-acetylcysteine (200 mg 8 hourly orally for 8 weeks)
- **Other measures:**
  - Chest physiotherapy
  - Pulmonary rehabilitation
  - Weight reduction and exercise
  - Vaccination: Influenza vaccine annually, pneumococcal vaccine 5 yearly & Haemophilus influenzae vaccine
  - Long-term domiciliary oxygen

Indications of long-term domiciliary oxygen therapy in COPD

- PaO_2 <7.3 kPa (55 mmHg) irrespective of $PaCO_2$ and FEV1 <1.5 L
- PaO_2 7.3 - 8 kPa (55 - 60 mmHg) with:
  - Secondary polycythemia
  - Nocturnal hypoxemia
  - Peripheral edema
  - Pulmonary hypertension
- Carboxyhaemoglobin <3% (in patient who have quit smoking)
- Terminally ill patient due to any cause with PaO_2 <7.3 kPa

Note: Measure ABGs in clinically stable patients on optimal treatment on minimum 2 occasions, 3 weeks apart.

Treatment of acute exacerbations

- Nebulized bronchodilators: terbutaline, ipratropium bromide
- IV antibiotics
- Supplemental O_2 (24-28%, 1-3 L/min)
- Hydrocortisone IV followed by oral steroids

Differences between emphysema and chronic bronchitis

Topic	Emphysema	Chronic bronchitis
Definition	Permanent dilatation of alveoli with destruction of their walls distal to the terminal bronchioles	Chronic cough with excessive mucoid sputum production, which is not attributable to any other cause, present on most days for a minimum of three consecutive months in a year for a minimum of two successive years.
Age (years)	50 - 75	45 – 50 (middle age)
Appearance	Pink puffer	Blue bloater
Body built	Lean & thin	Edematous
Dyspnea	marked	None or less marked
Lip pursing	Yes	No
Cough	Not present	Marked
Sputum	None	Mucoid
Cyanosis	Absent	Present
Chest shape	Barrel shaped	Normal
Chest examination	Percussion note is hyper-resonant with obliteration of liver & cardiac dullness. No wheeze or rhonchi on auscultation	Percussion note is normal. Plenty of rhonchi on auscultation
Pulmonary hypertension with cor-pulmoale	Late onset	Early onset
Secondary polycythaemia	Absent or late	Common
ABGs	PaO_2 normal or ↓, $PaCO_2$ normal	PaO_2↓, $PaCO_2$↑
Diffusing capacity	Reduced	Normal
CXR	Hyperinflated lung fields, bulla horizontal ribs, widening of ICS, low flat diaphragm, tubular heart	Normal

3. Chronic obstructive pulmonary disease (COPD)

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day? ...... Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** *... What is the colour of phlegm?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"*
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***COPD:*** *"Do you smoke?" (smoking history)*
  - ***LVF:*** *"Any chest pain, breathlessness on lying flat (orthopnoea), night-time awakening due to breathlessness, or swelling of the ankles?"*
  - **TB:** "Any fever, night sweats, weight loss or coughing up any blood?"

Drug or Treatment history

▶ GENERAL EXAMINATION

As per findings (Must have a look at the bedside for sputum pot)

- Sick looking and dyspnoeic
- Suprasternal and supraclavicular recession
- Respiratory rate: 30/min

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest shape:** Barrel shaped
- **Chest movement:** bilaterally restricted
- **Intercostal space:** appears full

Palpation:

- **Trachea:** central
- **Apex beat:** difficult to localize
- **Chest expansion:** decreased (? cm)

Percussion:

- **Percussion note:** Hyper-resonant bilaterally

- **Area of upper border of liver dullness:** In the 7th ICS in the right midclavicular line
- **Area of cardiac dullness:** Impaired

Auscultation:

- **Breath sounds:** Vesicular breathing with prolonged expiration
- **Added sounds:** Bilateral plenty of scattered rhonchi, present in both inspiration and expiration
- **Vocal resonance:** Normal

Examination of other systems

- No other abnormalities detected

"My diagnosis is chronic obstructive pulmonary disease."

Differential diagnoses

- Chronic severe or persistent bronchial asthma
- Chronic bronchitis (cough with sputum, not attributable to other causes, on most of the days of at least 3 consecutive months for 2 successive years)
- Bronchiectasis
- Congestive cardiac failure

DISCUSSION

▶ DEFINITIONS

COPD

- Breathlessness due to airflow limitation which is progressive and not fully reversible. Generally, the patient is smoker and > 40 years. There is:
  - Gradually worsening chronic productive cough
  - Progressive breathlessness
  - FEV_1 <80% predicted & FEV_1: FVC <70% predicted
  - Post-bronchodilator reversibility: FEV_1↑ <15% post-bronchodilator

Airflow limitation is caused by ↑mucus production and ↓mucocilliary clearance; ↑smooth muscles tone in the airways; loss of elastic recoil; and pulmonary hypertension.

Asthma

- Chronic reversible airflow limitation due to hyper-responsive airways presenting with paroxysmal breathlessness, cough, wheeze and chest tightness.

▶ INVESTIGATIONS

- **CBC:** Raised PCV secondary to polycythaemia due to persistent hypoxemia
- **CXR:** hyperinflated lung fields with ↑translucency, emphysematous bullae, horizontal ribs, widening of ICS, low flat diaphragm, tubular heart
- **ECG:** RVH if cor pulmonale
- **Echo:** look for P pulmonale or RVH for exclusion of cor pulmonale
- **Lung function tests:**
  - ***Spirometry*** (Post bronchodilator)
    - FEV_1 <80% & FEV_1: FVC <70% predicted
    - Post-bronchodilator reversibility: FEV_1↑ <15% post-bronchodilator inhalation
    - ↑residual volume (RV), ↑total lung capacity (TLC), ↓diffusion capacity of lungs for carbon monoxide (DLCO or TLCO) if significant emphysema
  - ***PEFR:*** reduced
- **ABGs:** ↓PaO_2, $PaCO_2$↑ or normal, pH <7.35
- **HRCT chest:** helpful in establishing diagnosis of emphysematous bulla and various forms of COPD which may not be obvious on CXR. The example include characteristic involvement of lower lobes in A1AT deficiency.
- **Sputum smear microscopy:** for establishing presence of superadded infections
- **Alpha-1 antitrypsin levels:** to find out deficiency in young, non-smoker patient with basal emphysema

ETIOLOGY

Environmental factors:

- Smoking
- Air pollution: Urban dwellers, biofuel mass
- Occupational: exposure to smoke, dust, chemicals, fumes
- Poor lung growth because of maternal smoking or recurrent childhood infections
- Low birth weight

Host factors:

- Alpha-1 antitrypsin deficiency
- Airway hyper-reactivity
- Males and Caucasians

COMPLICATIONS

- Polycythaemia
- Secondary infection
- Respiratory failure
- Cor pulmonale
- Pulmonary hypertension

CLASSIFICATION (GOLD CRITERIA)

Stages*	Spirometry	Symptoms
Mild	$FEV_1 \geq 80\%$ predicted	No or mild symptoms
moderate	FEV_1 50 - 79% predicted	Mild to moderate
Severe	FEV_1 30 - 49% predicted	Breathlessness on minimal exertion like dressing
Very severe	$FEV_1 < 30\%$ predicted or $FEV_1 < 50\%$ predicted + chronic respiratory failure	Breathlessness at rest

**FEV$_1$ / FVC is <70% in all stages of COPD*

MANAGEMENT

- **Drug therapy according to the stage:**

Stage	Management
I: Mild	• Avoid exposure to cause, influenza vaccine annually, pneumococcal vaccine 5 yearly • Inhaled short acting bronchodilators: β_2 agonist (terbutaline, salbutamol) or anticholinergic (ipratropium) on PRN basis
II: Moderate	**Add following to above:** • Regular one or more long acting bronchodilators: β_2 agonist (formoterol, salmeterol) or anticholinergic (tiotropium) • Pulmonary rehabilitation
III: Severe	**Add following to above:** • ICS (fluticasone) Used to reduce frequency & severity of exacerbations but it does not have any effect in slowing down the rate of decline in FEV1.
IV: Very severe	**Add following to above:** • Long-term domiciliary oxygen (LTOT) in chronic respiratory failure • Surgical treatment, if required

- Smoking cessation
- Avoidance of dust, fume, smoke, etc
- **Other therapy:**
  - Pulmonary rehabilitation
  - Mucolytic drugs (acetylcysteine)

  - Antibiotics (if superadded infection)
  - Diuretics (if Cor pulmonale)
  - Vaccination: Pneumococcal & influenza vaccine
  - Reduction of weight
- **Surgical intervention:**
  - ***Bullectomy:*** to excise large bullae compressing adjacent lung tissue in young patient who does not have generalized emphysema
  - ***Lung volume reduction surgery (LVRS):*** Useful in patients having emphysema with predominant involvement of upper lobe who does not have any evidence of pulmonary hypertension with preserved diffusion capacity of lungs
  - ***Lung transplantation***

Long term oxygen therapy

  - 2 - 4 L/min by nasal prongs for 15 hours/day (greater benefit in patients who receive >20h per day)
  - Raise PaO_2 to at least 8 kPa (60 mmHg) during rest or SaO_2 to at least 90%.

Air travel in COPD

- **Spirometry & hypoxic challenge test with 15% O2 for pre-flight assessment:** The patient is allowed to travel if SaO_2 maintained at >90%. Otherwise, air travel should be avoided or undertaken only with inspired oxygen therapy.
- **Supplementary O_2 during flight:** Give supplementary O_2 1 - 2 L/min during flight to keep the PaO_2 >50 mmHg. Patient already on domiciliary O_2 do need supplementary O_2 during the flight.

Prognosis (BODE index)

Variables	**Points on BODE index**			
	0	**1**	**2**	**3**
BMI	>21	<21	--	--
Obstruction to airflow (FEV_1 % predicted)	≥65	50 - 64	36 - 49	35
Dyspnea (MMRC scale)	0 - 1	2	3	4
Exercise capacity (distance in metres walked in 6 min)	≥350	250 - 349	150 - 249	<149

BODE index 0 - 2: 4 years mortality rate 10%

BODE index 7 – 10: 4 years mortality rate 80%

MANAGEMENT OF ACUTE EXACERBATION OF COPD (TYPE II RESPIRATORY FAILURE)

- **Oxygen:** O_2 given by Venturi mask increase PaO_2 >8 kPa (60 mm Hg). Start with 24 - 28% oxygen and gradually increase if there is no rise in $PaCO_2$. Ventilate if $PaCO_2$↑ and pH↓ <7.25.

  (patients with COPD are dependent on hypoxic drive for respiration. High flow O2 ↓ the responsiveness of chemoreceptors of the respiratory centre in the medulla oblongata and further exacerbate type 2 respiratory failure. Always give low flow oxygen to avoid it.

- **Nebulized bronchodilators:** Short acting β_2 agonist (salbutamol) + anticholinergic (ipratropium bromide)
- **Prednisolone:** 30 mg OD PO for 10 days

  (useful during acute exacerbation but avoid using as maintenance therapy)

  Indications:
    - COPD stage III / IV
    - COPD stage II if trial of oral steroids reveals responsiveness
    - Severe COPD exacerbations
    - Frequent COPD exacerbations
- **Antibiotic:** If suspicion of superadded infection
- **Diuretic:** to reduce peripheral edema in cor pulmonale
- **Chest physiotherapy**
- **Respiratory support:** If no response to above treatment and pH < 7.35, NIPPV (BiPAP).
- **Respiratory stimulant:** Doxapram not helpful

Indications for hospitalization:

- Severe symptoms non-responsive to outpatient treatment
- Altered consciousness
- Peripheral edema
- Cyanosis
- Co-morbid conditions / poor social circumstances

Note: Mostly the patients having acute COPD exacerbation can be managed at home with frequent nebulized bronchodilators, short course of oral steroid and antibiotics.

Discharge criteria

- Clinical improvement and stability
- No oxygen requirement during last 24 hours
- Requirement of inhaled bronchodilators < 4 hourly
- No parenteral therapy during last 24 hours
- No significant dyspnoea during eating and sleeping
- Sufficient understanding of patient and caretaker for administration medications at home
- Availability of home care arrangements (oxygen at home, community nurse, meals on wheels, GP & specialist)
- Follow up arrangement have been completed
- Patient ambulating independently and safely, and able to perform daily chores of life

Pathogens associated with acute COPD exacerbation

- **Common:**
    - Streptococcus pneumoniae
    - H. influenzae
- **Less common:**
    - Moraxella catarrhalis
    - Pseudomonas aeruginosa
    - Chlamydia pneumoniae

4. Chronic bronchitis with emphysema

HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day? ...... Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** *... What is the colour of phlegm?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"*
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
    - ***COPD:*** *"Do you smoke?" (smoking history)*
    - ***LVF:*** *"Any chest pain, breathlessness on lying flat (orthopnoea), night-time awakening due to breathlessness, or swelling of the ankles?"*
    - **TB:** "Any fever, night sweats, weight loss or coughing up any blood?"

Drug or Treatment history

GENERAL EXAMINATION

(As per findings)

- Dyspnoeic with pursed lip breathing, emaciated
- Supraclavicular and suprasternal excavation; obvious accessory muscles of respiration
- RR: 30/min

Lip pursing through partly closed lips helps in increasing end-expiratory pressure to keep the airways open during expiration, which help to reduce air trapping.

SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest shape:** barrel-shaped
- **Lower intercostal spaces:** lower intercostal spaces indrawing during inspiration caused by low flat diaphragm **(Harrison's sulcus)**

Palpation:

- **Trachea:** central? tracheal tug present? (tracheal descent during inspiration) ↓cricosternal distance? (distance between cricoid cartilage & suprasternal notch; normal distance 3 fingers breadth or more)
- **Apex beat:** difficult to localize
- **Chest expansion:** decreased (? cm)

Percussion:

- **Percussion note:** Hyper-resonant bilaterally
- **Area of upper border of liver dullness:** obliterated or in the 7th ICS in the right midclavicular line liver
- **Area of cardiac dullness:** obliterated

Auscultation:

- **Breath sounds:** reduced but vesicular breathing with prolonged expiration.
- **Added sounds:** bilateral plenty of scattered rhonchi, present in both inspiration and expiration.
- **Vocal resonance:** reduced

Examination of other systems

- No other abnormalities detected

"My diagnosis is chronic bronchitis with emphysema."

Differential diagnoses

- COPD
- Bronchial asthma
- Congestive cardiac failure (engorged & pulsatile veins in the neck, tender pulsatile hepatomegaly, and lower extremities pitting oedema)

DISCUSSION

▶ DEFINITIONS

Emphysema

- Permanent dilatation of alveoli distal to the terminal bronchioles with destruction of their walls. It presents with breathlessness on exertion with minimum cough, and lips pursing.

COPD

- Breathlessness due to airflow limitation which is progressive and not fully reversible.

▶ TYPES OF EMPHYSEMA

- **Centriacinar:** involvement of respiratory bronchioles only (proximal part of acini) with relative sparing of peripheral acini.
- **Panacinar:** Involvement of both central and peripheral portion of acini. Whole of the alveoli and alveolar ducts in acinus are involved. Usually caused by alpha-1 antitrypsin deficiency.
- **Paraseptal:** Involvement of the septa, pleura and blood vessels only
- **Irregular (scar) emphysema:** Scarring affects without acinus involvement

▶ CAUSES OF EMPHYSEMA

- Smoking
- Coal, dust
- Alpha-1 antitrypsin deficiency
- Macleod's syndrome (unilateral emphysema)

Prolonged smoking results in ↑synthesis of proteinase and ↑enzymatic inactivation of anti-proteinase. It produces imbalance between proteinase and anti-proteinase with leads to airways inflammation, release of oxidants and permanent damage to the connective tissue in the alveolar septa.

▶ CLINICAL SIGNS

- Dyspnea with lip pursing
- Supraclavicular and suprasternal recession during inspiration with prominent accessory muscles of breathing
- Barrel shaped chest
- Tracheal tug
- Cricosternal distance↓

- Lower intercostal space indrawing on inspiration
- Widening of intercostal spaces with horizontal ribs
- Wide subcostal angle
- Liver and cardiac dullness obliteration

Pink puffer

- Main feature exertional dyspnoea; cough less common
- Dyspnea with lip pursing but no cyanosis (pink) and no edema
- Lean and thin usually
- PaO_2 and PCO_2 relatively normal
- Age of presentation 50-75 years
- Usually patients with emphysema are pink puffer

Blue bloater

- Main feature cough with sputum; dyspnoea less common
- Cyanosis (blue) and edema (bloater) but no dyspnoea (or mild dyspnoea). Edema is due to cor pulmonale
- Pulmonary hypertension, RVH, cor pulmonale and secondary polycythaemia (patient appear plethoric)
- Markedly $\downarrow PO_2$ and $\uparrow PCO_2$
- Age of presentation 40-45 years
- Usually patients with chronic bronchitis are blue bloaters

▶ INVESTIGATIONS

- **CXR:** (features of emphysema)
  - Increased lungs translucency with loss of peripheral lung vascular markings
  - Bulla ± (pathognomonic)
  - Widening of intercostal spaces and horizontal ribs
  - Low flat diaphragm
  - Tubular heart
  - Prominent pulmonary arterial shadow (secondary to pulmonary hypertension)
- **Lung function tests:**
  - ***Spirometry*** (Post bronchodilator)
    - FEV_1 <80% predicted
    - FEV_1: FVC <70% predicted
    - Residual volume (RV)↑, total lung capacity (TLC)↑
  - ***PEFR:*** reduced
- **ABGs**
  - $PaO_2\downarrow$, $PCO_2\downarrow$ (due to hyperventilation), Impaired gas transfer of CO
- **Other investigations:**
  - CBC: raised haematocrit (polycythaemia)
  - HRCT Chest
  - Alpha-1 antitrypsin levels (in young patient with emphysema)
  - ECG: P-pulmonale, RVH, RAD in patient (if corpulmonale)
  - 2-D echocardiography
- **Lung biopsy** (for definitive diagnosis, but not done in routine)

▶ COMPLICATIONS

- Bullae which may result in pneumothorax
- Type-1 respiratory failure
- Pulmonary hypertension
- Cor pulmonale
- Polycythaemia

TREATMENT

- Smoking cessation
- **For dyspnoea:**
  - Inhaled salbutamol (200 µg 4 - 6 hourly) or ipratropium bromide (40 µg 4 hourly) or tiotropium (18 µg OD) or oxitropium (200 mg BID)
  - Add Inhaled beclomethasone (400 µg BD) If no response to above
  - Prednisolone 30 mg PO OD for 2 weeks followed by maintenance dose in severe cases
- **Antibiotic** (if evidence of infection)
- **Mucolytic drugs:** acetylcysteine (200 mg TID PO for 8 weeks)
- **Long term O_2 therapy**
- **Vaccination**:
  - ***5 yearly pneumococcal vaccine:*** two types
    - **Prevenar 13:** Pneumococcal conjugate vaccine (PCV13) helps protect people from 13 of the most severe serotypes
    - **Pneumo 23:** Pneumococcal polysaccharide vaccine (PPSV23) protects against an additional 23 serotypes.

      Pneumococcal vaccination includes both shots: first, the PCV13 shot and then the PPSV23 shot a year or more later conferring lifetime immunity in most of the cases. Give booster PPSV every five years if required.
  - ***Annual Influenza vaccine:***
    - Vaxigrip
  - ***Hemophilus influenza vaccine:***
    - ACT HiB
- **Other treatment:**
  - Exercise & weight reduction, if obese
  - Alpha-1 antitrypsin if deficient
  - Lung transplant in younger patients
  - Bullectomy if large bullae

Bullae

Bullae is thin walled air space formed by alveolar walls rupture. Usually situated subpleural which may result in pneumothorax if ruptured. Surrounding tissue may be compressed by large bullae which may compromise lung functions.

- **Etiology:**
  - Emphysema
  - Congenital
- **Treatment:**
  - Small bullae: Treat the primary cause, no other treatment required.
  - Large bullae with impaired lung functions: surgical ablation or bullectomy

Indications of long-term domiciliary oxygen therapy in COPD

- PaO_2 <7.3 kPa (55 mmHg), or SPO2 <88% irrespective of $PaCO_2$ and FEV_1 <1.5 L
- PaO_2 7.3 - 8 kPa (55 - 60 mmHg) associated with:
  - Secondary polycythemia
  - Nocturnal hypoxemia
  - Peripheral edema
  - Pulmonary hypertension
- Carboxyhaemoglobin <3% (in patient who have quit smoking)
- Terminally ill patient due to any cause with PaO_2 <7.3 kPa

Note: Measure ABGs in clinically stable patients on optimal treatment on minimum 2 occasions, 3 weeks apart.

Note: Domiciliary O_2 (LTOT) is given @ 2 - 4 L/min for 15 hours/day. Smoking must be stopped.

▶ MACLEOD'S SYNDROME (SWYER-JAMES SYNDROME)

It is the unilateral emphysema resulting from impairment of alveolar growth during childhood due to bronchitis or bronchiolitis.

5. Chronic bronchitis with cor-pulmonale

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day? ...... Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** *... What is the colour of phlegm?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"*
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***COPD:*** *"Do you smoke?" (smoking history)*
  - ***LVF:*** *"Any chest pain, breathlessness on lying flat (orthopnea), night-time awakening due to breathlessness, or swelling of the ankles?"*
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*

Details of swelling of feet

- **Duration:** *"Since how long you have swelling of feet?*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How far your swelling extends? ...Knees, thighs, or groin?"*
- **Aggravating factors:** *"What makes it worse? ... Is It more marked after prolonged standing?"*
- **Relieving factors:** *"What makes you feel better? .... Does it disappear when you wake up in the morning?"*
- **Association (D/D):**
  - *"Any breathlessness on lying flat, any exertional chest pain?"* **(CCF)**
  - *"Any frothing in the waters, burning micturition?"* **(Nephrotic syndrome)**
  - *"High coloured urine or yellow discoloration of whites of the eye? ...... Any swelling of your tummy?"* **(CLD)**

Drug or Treatment history

▶ GENERAL EXAMINATION

(As per findings)

- Emaciated looking
- RR: 26/min
- Bilateral pitting pedal edema
- Central cyanosis
- JVP↑ with prominent "a" wave

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest shape:** Barrel shaped
- **Chest movement:** bilaterally restricted
- Suprasternal, supraclavicular and intercostal excavation

Palpation:

- **Trachea:** trachea is central, tracheal tug +, cricosternal distance↓
- **Apex beat:** localization difficult
- **Chest expansion:** decreased

Percussion:

- **Percussion note:** Hyper-resonant bilaterally
- **Area of upper border of liver dullness:** In the 7th ICS in the right midclavicular line
- **Area of cardiac dullness:** Impaired

Auscultation:

- **Breath sound:** Reduced but vesicular breathing with prolonged expiration.
- **Added sounds:** bilateral plenty of scattered rhonchi, present in both inspiration and expiration. Few coarse bibasal crepitations also present.
- **Vocal resonance:** ↓

Cardiovascular System / Examination of the precordium

- **JVP**↑ with prominent 'a' wave

Inspection:

- Visible epigastric pulsation

Palpation:

- **Apex beat:** Palpable in left 5th ICS, ____cm from midsternal line
- P2 palpable
- Left parasternal heave and epigastric pulsation

Auscultation:

- **1st heart sound:** Normal
- **2nd heart sound:** Loud P2 in pulmonary area

Abdominal examination

Palpation:

- **Liver:** tender, hepatomegaly with liver span ______ cm in right midclavicular line. Soft in consistency, surface is smooth, margin is sharp and there is no hepatic bruit.
- **Spleen:** not palpable

Percussion:

- Flanks are resonant and there is no shifting dullness

Auscultation:

- No hepatic bruit

Examination of other systems

- No other abnormalities detected

"My diagnosis is chronic bronchitis with cor pulmonale."

(Clinical features of right heart failure caused by disease of the lung indicative of cor pulmonale)

Differential diagnoses

- CCF
- CLD (no jaundice or stigmata of CLD on examination)
- Nephrotic syndrome (generalized edema, massive proteinuria and hypoalbuminemia)

DISCUSSION

▶ DEFINITIONS

Cor pulmonale

- "RVH or RV dilatation with or without right heart failure secondary to diseases of lung parenchyma, pulmonary vasculature or chest wall."

Pack-year

- Pack year = No of cigarettes packs smoked per day X Number of years of smoking

▶ TYPES OF COR PULMONALE

- **Acute:** RV dilatation and RV failure resulting from acute pulmonary hypertension. Causes include massive pulmonary embolism and ARDS.
- **Chronic:** RVH or RV dilatation with or without right heart failure secondary to disorders of lung parenchyma, pulmonary vasculature or chest wall. "
  - ***Respiratory disorders:***
    - **Obstructive:** chronic persistent asthma, COPD, chronic bronchitis with emphysema
    - **Restrictive:** DPLD (ILD)
  - ***Pulmonary vascular disorders:***
    - Primary pulmonary hypertension
    - Vasculitis of the small pulmonary arteries
  - ***Chest wall or bony abnormality:*** obesity (Pickwickian syndrome), ankylosing spondylitis, kyphoscoliosis

▶ INVESTIGATIONS

- **CXR:** Right ventricular enlargement, right atrial dilatation; prominent pulmonary arterial shadow, loss of peripheral lung vascular markings (oligemic peripheral lung fields)
- **ECG**: right atrial & right ventricular hypertrophy
- **Echo**: RV dilatation and/or hypertrophy
- **Lung function tests**
- **Others**: CBC, ABGs, HRCT chest, pulmonary artery wedge pressure

▶ SIGNS OF PULMONARY HYPERTENSION

- **Pulse:** Low volume
- **JVP:** ↑JVP with prominent 'a' wave
- Epigastric pulsation due to RVH
- Left parasternal heave (due to RVH)
- Palpable P2
- Loud P2 on auscultation
- Early diastolic murmur of pulmonary regurgitation (Graham Steel murmur)

▶ SIGNS OF CHRONIC COR PULMONALE

Clinical signs of underlying primary lung disease **PLUS**

- **With right heart failure:**
  - Pedal edema
  - Pulsatile engorged neck veins
  - Tender hepatomegaly
- **Without right heart failure:**
  - Clinical signs of pulmonary hypertension and RVH (epigastric pulsation, left parasternal heave, palpable P2)

▶ CAUSES OF RIGHT HEART FAILURE

- Secondary to LVF (the most common cause)
- Cor pulmonale
- MI
- Valvular heart diseases: MS, PS, PR, TR
- Eisenmenger's syndrome (pulmonary hypertension with shunt reversal in PDA, ASD, VSD)
- Chronic constrictive pericarditis
- Cardiomyopathy

▶ MANAGEMENT OF COR PULMONALE

- **Heart failure management**
  - Fluid and salt restriction
  - Diuretics (frusemide)
  - Digoxin
  - Vasodilator drug
- **Treatment of the underlying disease:** COPD, ILD
- **Sildenafil:** to manage pulmonary hypertension
- **Venesection:** for polycythaemia if PCV > 55%
- **LTOT**

▶ PROGNOSIS

- Approximately 50% patients die within 5 years.

6. Bronchiectasis

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- ***Severity:*** *"How much phlegm you are coughing?* **(Profuse expectoration)** *...... How it looks like? ... Is it mucoid or purulent?* (Infrequently, the phlegm may be yellowish or purulent; foul smelling; or mixed with small amount of blood) *...... At what time of the day it is more marked?* (more marked after awaking from sleep in the morning) *...... Does it persist throughout the day? ...... Does it also affect your sleep?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*
- **Association (D/D):**
  - ***COPD:*** *"Do you smoke?" (smoking history)*
  - ***Childhood or previous infections:*** foreign body impaction, pulmonary TB or whooping cough
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- ***Severity:*** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
  - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)
  - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
  - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
  - ***DM:*** *"Any increased frequency of water works or increased thirst?"*

Drug or Treatment history

▶ GENERAL EXAMINATION

As per findings (Must have a look at the bedside for sputum pot)

- Slightly emaciated
- Generalized clubbing, but no hypertrophic osteoarthropathy
- RR: _____/min

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Movement of chest:** Slightly restricted (location?)

Palpation:

- **Trachea:** Central, no tracheal tug, cricosternal distance normal
- **Apex beat:** Palpable in left 5th intercostal space medial to the midclavicular line and normal in character
- **Chest expansion:** Normal

Percussion:

- **Percussion note:** Normal
- **Area of upper border of liver and area of cardiac dullness:** normal

Auscultation:

- **Breath sounds:** Vesicular breathing (bronchial breath sounds may be heard over the affected area)
- **Added sounds:** bibasal multiple coarse crepitations, present in both inspiration and expiration; which reduces or clears on coughing.

- **Vocal resonance:** Slightly↑ (location?)

Examination of other systems

- No other abnormalities detected.

"My diagnosis is bilateral bronchiectasis."

Differential diagnoses

- **DPLD (IPF):** characterized by dry cough, progressively worsening exertional breathlessness, fine end inspiratory bibasal crepitation (like unfastening of Velcro).
- **Pulmonary TB**

DISCUSSION

▶ DEFINITIONS

Bronchiectasis

- Abnormal, permanent dilatation of one or more bronchi proximal to the terminal bronchioles with destruction of their wall.

▶ CLINICAL FEATURES

- Cough productive of copious sputum expectoration, usually more marked after waking from sleep in the mornings.
- Haemoptysis (bleeding from erosion of exposed capillaries due to sloughing of friable hypertrophic bronchial wall mucosa. Erosion of bronchial artery may be catastrophic resulting in massive haemoptysis.
- Breathlessness in advanced stages
- Generalized clubbing
- Coarse crepitations on chest auscultation that reduce or disappear after coughing.

▶ CAUSES

Hereditary:

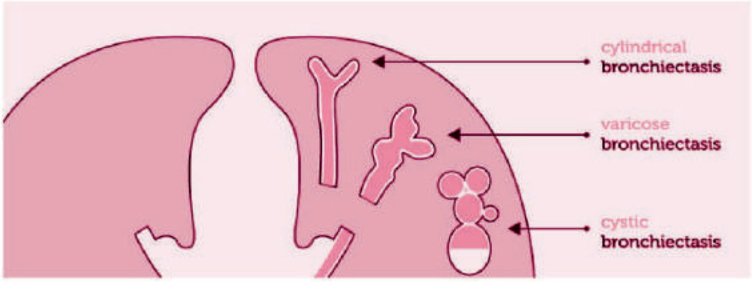
- **Cystic fibrosis**
- **Primary ciliary dyskinesia:** including immotile ciliary syndrome
- **Kartagener's syndrome:** characterized by triad of situs inversus or dextrocardia, bronchiectasis, and sinusitis or frontal sinus agenesis
- **Hypogammaglobulinemia:** IgA and IgG. It causes recurrent infection and bronchiectasis.
- **Young's syndrome:** characterized by obstructive azoospermia with male infertility and chronic rhinosinusitis believed to be caused by mercury intoxication
- **Yellow nail syndrome**
- **Sequestrated lung segment:** non-functioning mass of normal lung tissue that lacks normal communication with the tracheobronchial tree, and that receives its arterial blood supply from the systemic circulation.

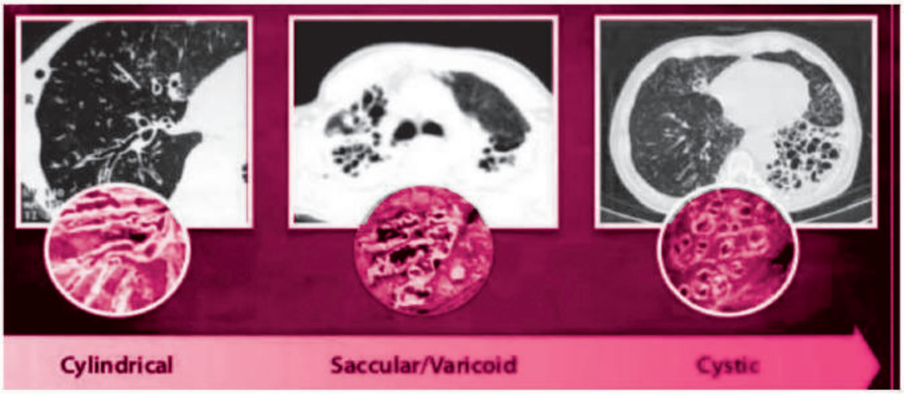
Acquired:

- **Children:** Pneumonia complicating measles, primary TB, whooping cough, & foreign body
- **Adults:** Post TB bronchiectasis, recurrent aspiration pneumonia, bronchial neoplasm
- **Allergic bronchopulmonary aspergillosis (ABPA):** characterized by proximal bronchiectasis

▶ TYPES OF BRONCHIECTASIS

- Cylindrical
- Fusiform
- Cystic or saccular (severe form)





Dry bronchiectasis (bronchiectasis sicca)

- There is dry cough with no sputum expectoration in dry bronchiectasis. Intermittent haemoptysis may result due to bleeding from bronchial vessels due to systemic vascular pressure which may be massive. It usually involves upper lobes of the lungs. TB usually causes dry bronchiectasis.

▶ INVESTIGATIONS

- **CXR:**
  - Linear streaks or tram line appearance (cylindrical bronchiectasis)
  - Ring shadows (cystic bronchiectasis)
  - Thickened bronchi, signet ring

  Left lower lobe and lingula is most common site of bronchiectasis.
- **HRCT chest:** Preferred investigation. Resolution of standard CT scan is 10 mm thick while that of HRCT it is 1-2 mm.
- **Others:**
  - ***CBC:*** (neutrophilic leucocytosis)
  - ***Sputum examination:*** microscopy, C/S, AFB, malignant cytology
  - ***X-ray PNS:*** if clinical suspicion of Kartagener's syndrome
  - ***Spirometry:*** usually obstructive pattern but in advanced cases there may be restrictive pattern
  - ***Work up for ABPA:*** Aspergillus skin prick test or sputum for fungal hyphae (if ABPA suspected)
  - ***Immunoglobulins electrophoresis:*** If clinical suspicion of hypogammaglobulinemia
  - ***Sweat test (for Na$^+$ and Cl$^-$):*** If clinical suspicion of cystic fibrosis (sweat chloride content > 60 mEq/L)
  - ***Nasal mucocilliary clearance of saccharin:*** It is > 30 min in ciliary dysfunction
  - ***24 hours urinary protein:*** for exclusion of amyloidosis & nephrotic syndrome which may result in long standing bronchiectasis.
  - ***USG abdomen:*** for confirmation of situs inversus

TREATMENT OF BRONCHIECTASIS

- **Postural drainage:** By percussing for 5-10 min over the affected area 1-2 times daily while lying with the side up
- **Chest physiotherapy**
- **Antibiotics for infection control**
- **Bronchodilator drugs:** nebulized salbutamol
- **Inhaled or oral steroid:** helpful in ABPA
- **Surgery:** lobectomy
- **Lung transplantation:** In bilateral extensive bronchiectasis

Indications of surgery:

Usually done in young patients

- Unilateral bronchiectasis confined to a single segment or lobe
- Recurrent and severe haemoptysis

COMPLICATIONS OF BRONCHIECTASIS

- Secondary infection (Pseudomonas aeruginosa, haemophilus influenzae, staphylococcus aureus); pleural effusion, empyema, lung abscess; or pneumothorax
- Respiratory failure
- Cor pulmonale & pulmonary hypertension
- Amyloidosis in longstanding cases
- Brain abscess
- Aspergilloma in the bronchiectatic cavity

CAUSES OF BASAL CREPITATIONS

- **Unilateral basal crepitation:**
  - Resolving pneumonia
  - Localized fibrosis
  - Unilateral bronchiectasis
  - Lung abscess
- **Bilateral basal crepitation:**
  - Pulmonary edema
  - IPF (fibrosing alveolitis or ILD)
  - Bilateral bronchiectasis
- **Causes of bilateral crepitation with clubbing:**
  - IPF (fibrosing alveolitis or ILD)
  - Bilateral bronchiectasis

Post-tussive crepitation

- Post-tussive crepitation appears after cough, usually at the apex, and indicates TB.

7. Diffuse parenchymal lung disease (DPLD)

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough

- *"Is it dry or are you bringing up any phlegm?"* (usually dry cough, but sometimes with scanty mucoid sputum)
- **Duration:** *"Since how long you have the cough?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? .... Does it persist throughout the day and night? .... Any hospitalisation?"*
- **Aggravating factors:** *"Does it worsens on exposure to dust or cold?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse with time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? .... And before the illness? ...... How many flights of stairs can you walk up before stopping? ... And before your illness? ...... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse? ... Cold, dust or activity? ... Any triggers? .... like viral illnesses, pollen, house dust mite, animal dander, etc."*
- **Relieving factors:** *"What makes you feel better? ...... Is it relieved by rest?"*
- **Ever had it before:** *Have you ever had it before? Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***COPD:*** *"Do you smoke?"* *(smoking history)*
  - ***LVF:*** *"Any chest pain, breathlessness on lying flat* *(orthopnea)*, *night-time awakening due to breathlessness, or swelling of the ankles?"*
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*
  - ***Connective tissue diseases:*** *"Any joint pain or swelling, any skin rash or oral ulcers?"* **(RA, SLE, systemic sclerosis, dermatomyositis)**
  - ***Extrinsic allergic alveolitits:*** *"Any contact with birds at work or at home? What do you do for your living?"* **(Cotton worker, sugar mill worker, bird fancier, farmer, etc)**
  - **Drug induced:** busulfan, bleomycin, methotrexate, nitrofurantoin, amiodarone

Drug or Treatment history

▶ GENERAL EXAMINATION

As per findings

- Dyspnoeic
- Cyanosis (tongue, lips and fingertips)
- Generalized clubbing, but no hypertrophic osteoarthropathy
- RR: 30/min

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest movements:** reduced on both the sides symmetrically

Palpation:

- **Trachea:** central
- **Apex beat:** Not displaced

Percussion:

- **Percussion note:** resonant on both sides
- **Area of upper border of liver dullness:** in 4th intercostal space in right midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

- **Breath sounds:** vesicular breathing with prolonged expiration
- **Added sounds:** Bibasal end-inspiratory fine crackles (like unfastening of Velcro) which are not altered by coughing
- **Vocal resonance:** normal

Examination of other systems

- No other abnormalities detected

My diagnosis is DPLD (likely IPF).

Differential diagnoses

- Bilateral bronchiectasis
- Lung fibrosis due to other causes
- Pulmonary edema from heart failure (Orthopnea and PND are features of heart failure with fine crepitations, present during both inspiration and expiration which are not altered by coughing)

DISCUSSION

- In DPLD, earlier known as interstitial lung disease (ILD), there is diffuse lung injury and inflammation which progressively worsens to lung fibrosis. Pulmonary alveoli are also affected apart from interstitium in DPLD.

▶ CLINICAL FEATURES

- Usually >50 years
- Dry cough
- Progressive exertional breathlessness (usually no resting breathlessness)
- Cyanosis and finger clubbing (20 - 50% cases)
- Arthralgia

▶ STAGES OF DPLD

- Stage of ground glass opacity (GGOs)
- Stage of reticulonodular shadow
- Stage of streaky fibrosis
- Stage of honeycombing

▶ CLASSIFICATION OF DPLD (6 GROUPS)

- ***Granulomatous DPLD:*** e.g. sarcoidosis
- ***Granulomatous DPLD with vasculitis:*** e.g. Churg Strauss syndrome, Wegener's granulomatosis, microscopic polyangiitis
- ***Idiopathic interstitial pneumonia (IIP):***
  - ***Idiopathic pulmonary fibrosis (IPF)/*** usual interstitial pneumonia (UIP)***:*** (90% cases) formerly called cryptogenic fibrosing alveolitis.
  - ***Idiopathic interstitial pneumonia other than IPF:*** (10%)
    - Acute interstitial pneumonia (AIP)
    - Lymphocytic interstitial pneumonia (LIP)
    - Desquamated interstitial pneumonia (DIP)
    - Nonspecific interstitial pneumonia (NSIP)
    - Cryptogenic organizing pneumonia (COP)/ bronchiolitis obliterans organizing pneumonia (BOOP-
    - Respiratory bronchiolitis
- ***Pulmonary autoimmune rheumatic diseases:*** e.g. SLE, RA

- ***Drugs:*** bleomycin, busulfan, amiodarone, nitrofurantoin, methotrexate
- ***Other forms of DPLD:*** Goodpasture's syndrome, Langerhans' cell histiocytosis (histiocytosis X), diffuse alveolar haemorrhage, idiopathic pulmonary hemosiderosis, lymphangioleiomyomatosis, pulmonary alveolar proteinosis

Hamman-Rich syndrome

A form of acute IPF

DIAGNOSTIC CRITERIA OF IPF

4 major **PLUS** 3 out of 4 minor criteria

Major criteria:

- Bibasilar reticular shadows with minimal ground glass opacities on HRCT chest
- Restrictive lung defect on lung function tests
- BAL or transbronchial lung biopsy not suggestive of alternative diagnosis
- Exclusion of other causes of DPLD

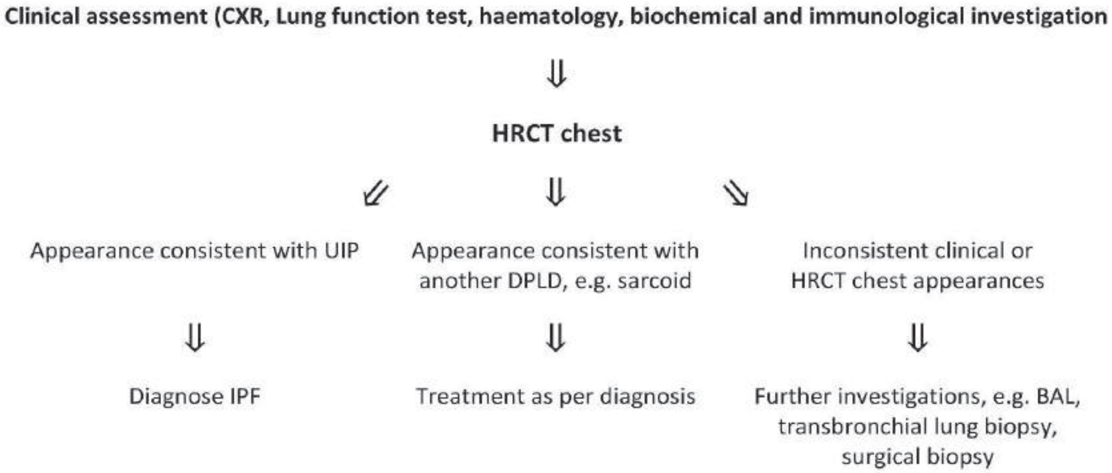
Minor criteria:

- >50 years, male, smoker
- Insidious onset unexplained exertional dyspnea
- Symptoms duration >3 months
- Bibasal end inspiratory fine crepitations (like unfastening of Velcro)

INVESTIGATIONS

- **CBC:**
  - Hypersensitivity pneumonitis: neutrophilia
  - Sarcoidosis: lymphopenia
  - Pulmonary eosinophilia/drug induced lung fibrosis: eosinophilia
- **CXR**: ground glass appearance initially; followed by reticulonodular shadowing and streaky fibrosis; and in advanced cases honeycombing. Lungs may be small in size with raised diaphragm.
- **HRCT chest**: Useful diagnostic modality, helpful even in earlier disease when CXR is normal. There are bibasal subpleural patchy reticular shadowing in the lung peripheries with no or minimal ground glass changes; honeycomb appearance, traction bronchiectasis.
- **Lung function tests:**
  - ***Spirometry:*** Restrictive pattern with proportionately ↓FEV_1 & FVC; normal or ↑FEV_1/FVC ratio; ↓lung volumes; ↓ diffusion capacity of CO
  - ***PEFR:*** may be normal
- **ABGs:** ↓PaO_2, normal or ↓PCO_2 (because of hyperventilation)
- **Bronchoscopy /BAL:** ↑neutrophils & macrophages. ↑lymphocytes in extrinsic allergic alveolitis, sarcoidosis and drug induced lung fibrosis.
- **Others** (according to cause suspected)
  - *↑CRP*
  - *↑LDH:* indicates active disease in DPLD
  - ***Sarcoidosis:*** hypercalcemia, ↑24 hours urinary Ca^{+2}, ↑serum ACE levels (indicator of disease activity)
  - ***Autoimmune conditions:*** ANA, RA factor, anti-CCP antibodies.
  - ***Hypergammaglobulinemia:*** Serum immunoglobulins electrophoresis
  - ***Lung biopsy:*** needed only in uncertain cases but not performed routinely. Following modalities can be used for it:
    - Transbronchial with the help of bronchoscope
    - Video assisted thoracoscopic (VATS)
    - Open lung biopsy

Note: characteristic clinical features and HRCT chest suffice the diagnosis, but in young patients, lung biopsy is strongly recommended.


Clinical assessment (CXR, Lung function test, haematology, biochemical and immunological investigation
HRCT chest
Appearance consistent with UIP
Appearance consistent with another DPLD, e.g. sarcoid
Inconsistent clinical or HRCT chest appearances
Diagnose IPF
Treatment as per diagnosis
Further investigations, e.g. BAL, transbronchial lung biopsy, surgical biopsy

TREATMENT OF IPF

- **Prednisolone 0.5 mg/kg PO OD + Azathioprine 2-3 mg/kg PO OD if**
    - Rapidly progressive disease
    - Severe symptoms
    - FVC↓ >50% over 3-6 months
    - GGOs on HRCT chest

Give prednisolone for a minimum of 2 months followed by tapering to 10 - 12.5 mg OD as a maintenance dose.

- **Antifibrotic therapy (on trial):**
    - Pirfenidone
    - Bosentan
    - Sildenafil
    - Thalidomide
    - Etanercept (biological agent)
    - N-acetyl cysteine
    - Interferon ɣ1b
- **Single lung transplantation:** consider for advanced disease in young patients. 60% survival at 1 year.

PROGNOSIS OF IPF

- 3 - 5 years survival in 50% cases

COMPLICATIONS OF IPF

- Respiratory failure
- Cor pulmonale & pulmonary hypertension
- Bronchial carcinoma

CAUSES OF BIBASAL CREPITATIONS

- **LVF:** characterized by fine bibasal crepitations altered by coughing, ↑JVP, gallop rhythm etc
- **Bilateral bronchiectasis:** Coarse crepitations both in inspiration and expiration that change on coughing
- **DPLD:** coarse end-inspiratory crepitations (sudden opening of collapsed alveoli at the end of inspiration)

CAUSES OF CLUBBING WITH BIBASAL CREPITATIONS

- Bilateral bronchiectasis

▶ DPLD DIFFERENCES BETWEEN IPF (UIP) AND COP (BOOP)

Clinical features	IPF (UIP)	COP (BOOP)
Age	Elderly	Adult
Smoking	Association	No association
Onset	Insidious	Abrupt
Constitutional symptoms (fever, weight loss and fatigue)	Uncommon	Common
Clubbing	Present	Absent
ESR	Normal	↑↑
Lung function tests	Restrictive lung defect with ↓diffusing capacity	Restrictive with concomitant obstruction lung defect in 25% cases
CXR	Small sized lungs	Normal sized lung
ANA, RA tests	Positive in 30% cases	Negative
Biopsy	Usually not needed	Needed. Characteristic appearance: buds of connective tissue (Masson's bodies)
Corticosteroids response	Poor	Good in 2/3rd cases
Prognosis	Poor, median survival 3-5 years	Good if steroid responsive.

▶ RESTRICTIVE AND OBSTRUCTIVE AIRWAY DISEASES

- **Restrictive:** DPLD, kyphoscoliosis, ankylosing spondylitis
- **Obstructive:** bronchial asthma, COPD, chronic bronchitis, emphysema

Features	Restrictive	Obstructive
FEV_1 & FVC	Proportionately↓	Markedly ↓FEV_1, FVC ↓
FEV_1/FVC ratio	Normal or ↑	↓ (<70%)
RV	Normal or ↓	↑
TLC	↓	↑

8. Pleural effusion (tubercular)

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day?* (present throughout day and night) ...... *Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** Usually dry cough with occasional scanty mucoid sputum, without haemoptysis ... *How the phlegm looks like?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"*
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***COPD:*** *"Do you smoke?"* *(smoking history)*
  - ***LVF:*** *"Any chest pain, breathlessness on lying flat* *(orthopnoea)*, *night-time awakening due to breathlessness, or swelling of the ankles?"*
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*

Details of fever

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* **(Constant or intermittent)** ... *How often does it peak in 24 hours?"* (low grade continuous fever with evening rise associated with night sweats)
- **Aggravating & relieving factors:** *"What makes it better?"* *(antipyretics)*
- **Associations (D/D):** *"Do you have any other symptoms with fever?"*
  - ***Parapneumonic /TB effusion:*** *"Any chest pain that aggravates on breathing, night-time fever with sweats, cough with expectoration of blood, weight loss, or contact with pulmonary TB patient?"*
  - ***Malignant pleural effusion***
  - ***Connective tissue / autoimmune diseases:*** *"Any joint pain or joint swelling, skin rash or oral ulcer?"* (SLE, RA, sarcoidosis)

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
  - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)
  - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency?"*

  - *TB:* *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
  - *DM:* *"Any increased frequency of water works or increased thirst?"*

GENERAL EXAMINATION

As per findings

- Ill-looking and emaciated
- Temperature: 100°F
- RR: 20/min

SYSTEMIC EXAMINATION

Respiratory System: (assume right Sided pleural effusion)

Inspection:

Chest movements: restricted on the right side in the lower part of the chest. ICS appears full. (Do tell about the evidence of aspiration of pleural effusion indicated by puncture mark, gauze and tape, if present)

Palpation:

- **Trachea:** shifted to the left side
- **Apex beat:** displaced to the left (palpable in 6th ICS in the left anterior axillary line) but normal in character
- **Chest expansion:** decreased over the right lower chest

Percussion:

- **Percussion note:** stony dull in the right lower chest up to ... intercostal space (mention location)

Auscultation:

- **Breath sounds:** reduced (or absent) in the right lower chest
- **Vocal resonance:** reduced (or absent) in the right lower chest
- **Added sounds:** None

The following findings may be present just above the upper level of effusion:

  - Bronchial breath sounds
  - Whispering pectoriloquy
  - Pleural rub
  - ↑vocal resonance

Examination of other systems

- No other abnormalities detected

My diagnosis is right sided pleural effusion.

Because of stony dull percussion note; ↓breath sounds and vocal resonance in the affected area along with mediastinal shifting.

Likely tuberculous etiology because of associated low-grade fever with evening rise and night sweats, marked weight loss.

Differential diagnosis

- Parapneumonic effusion
- **Malignant pleural effusion** (in chronic heavy smoker, bronchial carcinoma needs to be excluded)

DISCUSSION

INVESTIGATIONS

- **CXR**
- **CT Scan chest**
- **CBC:** ↑ESR in TB, ↑TLC in pneumonia
- **Mantoux test**
- **Diagnostic pleural fluid tap:**
  - *Color:* straw coloured, serous, chylous, hemorrhagic?
  - *Microscopy and malignant cytology* (for malignant cells)

  - ***Biochemistry:*** pleural fluid proteins, LDH, ADA (high in tuberculosis); serum proteins and LDH (Apply Light's criteria to differentiate between transudative and exudative pleural effusion)
  - ***Culture and sensitivity (C/S)***
  - ***AFB and MTB C/S***
- **Pleural biopsy with Abram's or Cope's needle**
- **Other investigation of pleural fluid: (according to the cause suspected):**
  - RA factor and cholesterol (RA)
  - ↑amylase (acute pancreatitis, malignancy, esophageal rupture)
  - ↑triglycerides (chylothorax)
- **Sputum Gram staining, AFB, C/S, MTB C/S and malignant** cytology)
- **FNAC or excision biopsy lymph node:** for lymphoma, metastasis
- **Miscellaneous investigations as per likely cause:**
  - ANF, anti-DS DNA (SLE)
  - LFTs
  - 24 hours urinary proteins and serum total protein (if nephrotic syndrome suspected)

Note: The yield of pleural fluid for AFB is 20% while pleural biopsy has 80%. The yield of pleural biopsy, in malignancy, is 40 - 60%.

Normal pleural fluid is 5 - 15 mL.
At least following quantity of pleural fluid is required for detection by:

- **Clinically:** 500 mL
- **On CXR PA view:** 300 mL
- **X-Ray lateral decubitus position:** At least 100 mL of fluid is necessary
- **USG:** <100 mL or even 20 to 25 ml fluid can be detected

▶ D/D OF DULL PERCUSSION NOTE OVER LOWER CHEST

- Consolidation (woody dull)
- Collapse of the lung
- Lung mass
- Thickened pleura
- Raised right hemidiaphragm (due to hepatomegaly or liver pushed up)
- Pleural effusion (stony dull)

▶ CAUSES OF PLEURAL EFFUSION

Common causes

- Tuberculosis
- Parapneumonic
- Bronchial carcinoma
- Pulmonary infarction

Causes of right-sided pleural effusion

- Dengue haemorrhagic fever
- Meig's syndrome
- Liver abscess

Causes of eft-sided pleural effusion

- Esophageal rupture (Boerhaave's syndrome)
- Acute pancreatitis
- Rheumatoid arthritis
- Dressler's syndrome
- Dissecting aneurysm

Causes of bilateral effusion

- ***All transudative causes***
    - CCF
    - Cirrhosis of liver
    - Nephrotic syndrome
    - Malnutrition or malabsorption, hypoproteinaemia
- ***Connective tissue diseases:*** RA and SLE
- ***Pulmonary TB***
- ***Malignant effusion***
- ***Pulmonary infarction***

Causes of exudative and transudative pleural effusion

- ***Exudative (protein >3 g/L):***
    - Tuberculous effusion
    - Parapneumonic effusion
    - Subpulmonic effusion: subphrenic abscess, liver abscess
    - Malignant effusion
    - Pulmonary infarction
    - Collagen disease: SLE, RA
    - Dressler's syndrome (post-MI fever with pleuritic chest pain caused by pericarditis, pleurisy and pneumonitis)
    - Yellow nail syndrome
    - Secondary to acute pancreatitis
- ***Transudative (protein <3 g/L):***
    - CCF
    - Liver cirrhosis
    - Nephrotic syndrome
    - Malnutrition
    - Meig's syndrome (right sided pleural effusion, ascites and ovarian fibroma)
    - Hypothyroidism

Criteria	Exudative	Transudative
Appearance	Straw-coloured, purulent, chylous or blood-stained	Clear or serous
Protein	>3 g/l	<3 g/L
Glucose	Low	Normal
Cholesterol	>60 mg/dL	<60 mg/dL
Light's criteria		
LDH	>2/3rd of the upper limit of normal	<2/3rd of the upper limit of normal
Pleural fluid LDH: serum LDH ratio	>0.6	<0.6
Pleural fluid protein: serum Protein ratio	>0.5	<0.5
Serum-effusion albumin gradient (serum albumin minus pleural fluid albumin)	<1.2 g/Dl	>1.2 g/dL

- Pleural fluid cholesterol in transudative effusion is <60 mg/dl, while in exudative effusion >60 mg/dl. Pleural fluid cholesterol in all malignant effusion is >60 mg/dL, being exudative. This can be useful in for identification of malignant effusion.

- Pleural fluid ADA levels are high in tubercular effusion.

Causes of ↓pH and ↓glucose in pleural fluid

- Empyema
- Tuberculosis
- Malignant pleural effusion
- Esophageal rupture
- SLE, RA

Causes of ↑pleural fluid amylase (more than serum)

- Acute pancreatitis
- Esophageal rupture
- Malignant effusion
- Adenocarcinoma of lung (useful in differentiating it from mesothelioma)

Recurrent pleural effusion

Causes

- Bronchial carcinoma, mesothelioma, or lymphoma
- Connective tissue diseases: SLE, RA
- Transudative effusion causes: CCF, nephrotic syndrome, cirrhosis of liver

Treatment

- ***Pleurodesis***
  - Remove the pleural fluid as much as possible by introducing a plain rubber tube through the intercostal space. Tetracycline (500 mg), talc or kaolin is introduced through the tube, and clamped for 4-8 hours. Bleomycin 30-60 mg is used for malignant pleural effusion.
  - Advise the patients to change the posture every 2 hour to allow the drug to spread in pleural space.
  - Remove any remining pleural fluid after 4-8 hours and take out the tube at the maximum inspiration.
  - Prescribe analgesics as pleurodesis causes severe chest pain.

Sub-pulmonic effusion

- It is the pleural effusion between the upper surface of diaphragm and the lower surface of lung. It can be confused easily with subphrenic abscess but CXR in lateral decubitus position or USG chest or CT scan chest can differentiate both.

Loculated effusion or pseudotumor (phantom tumor)

- It is caused by accumulation of pleural fluid in interlobular fissure. Commonly seen in CCF.
- CXR: rounded homogeneous opacity, usually along the lateral chest wall. USG or CT chest reveals localized or encysted effusion.

▶ TYPES OF PLEURAL EFFUSION BASED ON COLOUR

- Serous (hydrothorax)
- Straw-coloured
- Purulent (empyema or pyothorax)
- Haemorrhagic (haemothorax)
- Milky or chylous (chylothorax)

Haemothorax (blood stained fluid)

Causes

- Chest trauma
- Bronchial carcinoma or mesothelioma
- Pulmonary infarction
- Others: SLE, acute pancreatitis

Differences between traumatic haemothorax and haemorrhagic pleural effusion

Traumatic haemothorax	Haemorrhagic pleural effusion
Not as much uniform	Mixed uniformly
Clots on standing	Do not clot
RBC not crenated (fresh RBC)	Crenated RBC
RBC >100,000/mm^3	RBC > 10,000/mm^3

Empyema thoracis or pyothorax (Purulent)

Causes

- Bacterial pneumonia
- Tuberculosis
- Lung abscess; subphrenic or liver abscess ruptured in pleural cavity
- Iatrogenic infection of pleural effusion

Clinical features

- High fever with chills and rigors; pleuritic chest pain; breathlessness; purulent sputum if empyema ruptures into a bronchus (bronchopleural fistula)
- Toxic look; clubbing; signs of pleural effusion

Empyema necessitans

- It is the tracking out of pleural fluid into subcutaneous tissue in empyema thoracis/

Pleural fluid analysis

- Purulent and thick
- Low glucose (<3.3 mmol/L or <60 mg/dl), protein exudative, LDH >1000 U/L, pleural fluid pH 7.2-7.3 indicate an impending empyema
- pH <7.2 is an indication for tube thoracotomy

Treatment of empyema thoracis

- *Non-tuberculous:*
  - **Tube thoracotomy:** Using a wide bore intercostal tube under water seal drainage
  - **Antibiotics:** Start empirical treatment with Co-amoxiclav or cefuroxime plus metronidazole IV. Alter based on C/S and continue for 2-6 weeks.
  - **Surgical decortication:** using VATS, if pus is thick or loculated, or the visceral pleura is grossly thickened.
- *Tuberculous empyema:*
  - Start ATT
  - **Needle or tube thoracotomy:** Using wide bore needle or intercostal tube under water seal drainage

Chylothorax (milky or whitish fluid)

Causes

- Thoracic duct obstruction or injury:
  - Surgery or trauma
  - Malignancy (bronchial carcinoma, metastasis)
  - Infection (TB and filariasis)
  - Lymphoproliferative disorder

Differentiation between chylothorax and empyema

- The pleural fluid is centrifuged. If it clears after centrifuging, it is empyema; and if persistently cloudy or milky, it is chylothorax.

Hydrothorax

- Transudative pleural fluid is called hydrothorax. It is usually bilateral

► YELLOW NAIL SYNDROME

A hereditary disorder characterized by:

- Thick, yellow nails with onycholysis

- Pleural effusion or bronchiectasis
- Lymphedema in legs

PLEURAL FLUID TAP

- Drain up to 1500 mL of fluid to avoid re-expansion pulmonary edema.
  (Due to pleural effusion, there is compression of the lung resulting in ischemia of lung parenchyma and necrosis of pulmonary vessels. Over ambitious withdrawal of pleural fluid result in rapid lung expansion leading to rapid leakage of fluid from necrotic vessels and pulmonary edema)

ROLE OF STEROIDS IN TB PLEURAL EFFUSION

- Steroids, when used with ATT, enhances rapid pleural fluid absorption with quick symptomatic relief. Steroids also prevents pleural adhesion and fibrosis.

9. Lung abscess

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day?* (more marked after waking from sleep in the morning) ...... *Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** copious amount ...... *How the phlegm looks like? ... Is it mucoid or purulent?* **(foul smelling purulent or yellowish sputum occasionally associated with scanty blood, relieved after taking antibiotics)**
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of fever

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* **(Constant or intermittent)** ... *How often does it peak in 24 hours?"* (high grade continuous fever associated with chills, rigors and profuse sweating)
- **Aggravating & relieving factors:** *"What makes it better?" (antipyretics)*

Details of chest pain

- **Site:** *"Where exactly the chest pain is?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull?"* (compressive in nature)
- **Radiation:** *"Does it move anywhere else like your left arm, neck, jaw or back?"* (no radiation)
- **Association (D/D):**
  - ***IHD:*** *"Do you have chest pain at rest, or it appears on exertion? ... Does it stop after stopping exertion and returns on restarting? ... Does it appear on walking uphill or climbing stairs? ... How many meters can you walk on the flat before it appears?"*
  - ***Aortic dissection:*** *"Is it sudden onset severe tearing pain between your shoulder blades radiating to the neck or down to the back?"*
  - ***Musculoskeletal:*** *"Does it increase on pressing or movements?"*
  - ***Pleuritic:*** *"Does it worsen on taking deep breath in?"* ***(pulmonary embolism, pneumonia)***
  - ***Pericardial:*** *"Does it worsen on lying flat?"*
  - ***GERD:*** *"Any association with eating or hunger?"* ***(APD)***
  - ***Esophageal rupture:*** *"Did you have any recurrent vomiting before you developed chest pain?"*
  - ***Post herpetic neuralgia:*** *"Do you have any painful rash with clusters of blisters over your chest?"*
  - ***Spinal mass or disc herniation:*** *"Does it worsen on coughing or sneezing?"*
- **Timings:** *"Since how long you have the chest pain? ...Is it constant, or comes and goes?"*
- **Exacerbating /alleviating factors:** *"What makes it better? ..... What makes it worse?"* (worse with inspiration and during coughing)
- **Severity:** *"How bad is the pain on a scale of 1-10?"*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
  - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)

- ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency?"*
- ***TB:*** *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
- ***DM:*** *"Any increased frequency of water works or increased thirst?"*

▶ GENERAL EXAMINATION

As per findings

- Toxic looking
- Generalized clubbing
- Temp: 103 °F
- Tachypnoea with respiratory rate: 28/min

▶ SYSTEMIC EXAMINATION

Respiratory System (Supposing Right abscess)

Inspection:

- **Chest movements:** on the right side of chest restricted

Palpation:

- **Trachea:** central in position
- **Apex beat:** Not displaced (palpable in the 5th intercostal space, just medial to the left midclavicular line), normal in character
- **Chest expansion:** decreased on the right side

Percussion:

- **Percussion note:** woody dull from ... to ... ICS over right side of chest
- **Area of upper border of the liver dullness:** in the 5th intercostal space in right midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

- **Breath sounds:** bronchial breathing from ... to ... ICS on the right side of the chest. Rest of the chest have vesicular breath sounds.
- **Vocal resonance:** ↑ in the same area of chest
- **Added sounds:** right side of the chest have coarse crepitations from ___ to ___ ICS, that reduces on coughing

Examination of other systems

- No other abnormalities detected

My diagnosis is right sided lung abscess.

Based on toxic look of the patient, high grade temperature, cough productive of purulent and foul-smelling sputum, clubbing (in 10% of cases after 3 weeks). CXR reveals cavity with air fluid levels.

Differential diagnoses

- **Consolidation** (during resolution stage)
- **Bronchiectasis** (characterized by profuse expectoration of sputum, more marked on awakening; but no fever, no toxic look of the patient unless secondary infection; clubbing; coarse crepitation mostly on the basal area)
- **Bronchial carcinoma**
- **Pulmonary TB**

DISCUSSION

▶ CLINICAL FEATURES

Symptoms

- High grade fever with rigors and chills
- Productive cough with profuse foul-smelling sputum (due to anaerobes)
- Haemoptysis

- Pleuritic chest pain

Signs

Clinical signs could be elicited if the lung abscess is near to the lung surface but may be absent if lung abscess is deeply seated within the lung parenchyma.

- Usually signs of consolidation
- Rarely signs of cavitation
- If the abscess is large there may be combined signs of consolidation and cavitation.

▶ CAUSES

Causes of lung abscess

- ***Aspiration of oropharyngeal or nasopharyngeal contents:*** Both aerobic and anaerobic organisms are involved. Examples include aspiration in unconscious patient, vomiting during induction of anaesthesia, achalasia cardia.
- ***Specific infections:*** Staphylococcus aureus, Klebsiella pneumoniae, streptococcus pneumoniae type 3, fungal infection.
- ***Bronchial obstruction:*** foreign body, malignancy, enlarged lymph nodes
- ***Superadded infection after pulmonary infarction:*** Staphylococcus aureus, Streptococcus pneumoniae, H. influenzae & anaerobic
- ***Local spread from liver or subphrenic abscess:*** result from transdiaphragmatic spread
- ***Hematogenous spread:*** IV drug abuse, right sided endocarditis, salpingitis, septic emboli from pelvic abscess

Causes of cavitary lesion in lung

- Lung abscess
- Cavitatory pneumonia
- Cavitatory tuberculosis
- Cavitating bronchial carcinoma
- Rheumatoid nodules
- Wegener's granulomatosis
- Pulmonary infarction
- Fungal infection (histoplasmosis)

Causes of multiple cavitary lesions / lung abscesses

- Tuberculosis
- Aspiration of infected material
- Staphylococcal lung abscess (in children)
- Klebsiella
- Fungal infection
- Amebiasis

▶ COMMON SITES

- Lung abscess commonly develop in right middle lobe as right major bronchus is less oblique. Albeit, site of abscess formation is dependent on patient's posture at the of aspiration.
  - ***Posterior segment of right upper lobe or superior segment of lower lobe:*** If aspirated while lying
  - ***Basal segment:*** if aspirated in upright position

▶ INVESTIGATIONS

- **CBC:** raised TLC
- **CXR:** cavitation with air fluid levels
- **Sputum microscopy:** Gram staining, C/S (aerobic & anaerobic), AFB, fungus, malignant cytology
- **Bronchoscopy:** for exclusion of mass or foreign body
- **CECT chest**
- **BSR**

▶ COMPLICATIONS

- Pleurisy
- Empyema
- Cerebral abscess (commonly involve parietal lobe or posterior frontal region)
- Septicaemia
- Bronchiectasis
- Fibrosis

▶ TREATMENT OF LUNG ABSCESS

Treatment the underlying cause

- **Empirical Broad-spectrum antibiotics**
  - Amoxicillin / co-amoxiclav / erythromycin + metronidazole **OR**
    Cefuroxime 1.5 gm IV TID + metronidazole 500 mg IV TID for 5 days
  - Switch to oral cefaclor **+** metronidazole after 5 days and continue for 4 - 6 weeks.

Change as per C/S report if not improving.

- **Postural drainage and chest physiotherapy**
- **USG / CT guided aspiration:** If no response to medical treatment (1 - 10% cases)
- **Lobectomy:** if
  - No response to treatment
  - Abscess increasing in size
  - Massive hemorrhage or hemoptysis

10. Bronchial carcinoma

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough? Is it dry or with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day?* (present throughout day and night) ...... *Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** Usually dry cough with occasional scanty mucoid sputum, without haemoptysis ... *How the phlegm looks like? ... mucoid, purulent?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

Details of blood in phlegm

  - *"Are you coughing up fresh red blood or it is discoloured brown phlegm?"*
  - *"Is the blood mixed in with phlegm or coating it?"*
- **Duration:** *"Since how long you have the problem?"*
- **Severity:** *"How much it was? ... About a spoonful or egg-cup full?* (streaks of frank blood with sputum) ...... *How many times you have coughed up blood? ...... Any episode of massive coughing up of blood? ... How many days ago?"*
- **Associations (D/D):**
  - ***Bronchial carcinoma or mesothelioma:*** *"Any coughing of blood with chest pain, shortness of breath, weight loss or loss of appetite, difficulty in swallowing, hoarseness of voice? Any work history as a plumber or on shipyard?"*
  - ***TB:*** *"Any evening fever with drenching sweats, weight loss?"*
  - ***COPD exacerbation:*** *"Do you previously have smoker lung disease? ... Is the phlegm volume has increased, with yellowish discolouration (purulence) and breathlessness?"*
  - ***Bronchiectasis:*** *"Any history of recurrent infections of lungs in childhood?* (Childhood pneumonia) *Any past history of pulmonary tuberculosis?"*
  - ***Pulmonary embolism:*** *"Any sudden onset chest pain, breathlessness, blood clot in the blood channels of your legs?"*
  - ***Mitral stenosis:*** *"Any past history of tight or narrowing of heart valves, palpitations?"*
  - ***Bleeding disorder, anticoagulants***

Details of chest pain

- **Site:** *"Where exactly the chest pain is?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull?"* (compressive in nature)
- **Radiation:** *"Does it move anywhere else like your left arm, neck, jaw or back?"* (no radiation)
- **Association (D/D):**
  - ***IHD:*** *"Do you have chest pain at rest, or it appears on exertion? ... Does it stop after stopping exertion and returns on restarting? ... Does it appear on walking uphill or climbing stairs? ... How many meters can you walk on the flat before it appears?"*
  - ***Aortic dissection:*** *"Is it sudden onset severe tearing pain between your shoulder blades radiating to the neck or down to the back?"*
  - ***Musculoskeletal:*** *"Does it increase on pressing or movements?"*
  - ***Pleuritic:*** *"Does it worsen on taking deep breath in?"* ***(pulmonary embolism, pneumonia)***
  - ***Pericardial:*** *"Does it worsen on lying flat?"*
  - ***GERD:*** *"Any association with eating or hunger?"* ***(APD)***
  - ***Esophageal rupture:*** *"Did you have any recurrent vomiting before you developed chest pain?"*
  - ***Post herpetic neuralgia:*** *"Do you have any painful rash with clusters of blisters over your chest?"*

  - ***Spinal mass or disc herniation:*** *"Does it worsen on coughing or sneezing?"*
- **Timings:** *"Since how long you have the chest pain? ...Is it constant, or comes and goes?"*
- **Exacerbating /alleviating factors:** *"What makes it better? ..... What makes it worse?"* (worsens with deep coughing, breathing and on lying on affected side)
- **Severity:** *"How bad is the pain on a scale of 1-10?"*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
  - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)
  - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency?"*
  - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
  - ***DM:*** *"Any increased frequency of water works or increased thirst?"*

▶ GENERAL EXAMINATION

As per findings

- Emaciated
- Generalized clubbing (mention hypertrophic osteoarthropathy if present)
- Nicotine stain on right index fingernail
- Right supraclavicular lymph nodes are palpable, nontender, hard in consistency, fixed with overlying skin and underlying structures
- RR: 22/min

▶ SYSTEMIC EXAMINATION

Respiratory System (Supposing right sided lesion)

Inspection:

- **Chest movements:** reduced in the right upper chest

Palpation:

- **Trachea:** central in position
- **Apex beat:** Not displaced (palpable in the 5th intercostal space, just medial to the left midclavicular line), normal in character

Percussion:

- **Percussion note:** dullness to percussion in right upper chest up to .... ICS
- **Area of upper border of the liver dullness:** in the 5th ICS in the right midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

- **Breath sounds:** absent or ↓ in the right upper chest
- **Vocal resonance:** absent or ↓ in the same area
- **Added sounds:** occasional crepitations ± pleural rub in the affected area

Examination of other systems

- No other abnormalities detected.

My diagnosis is bronchial carcinoma with metastasis (in right supraclavicular LN).

Based on chronic smoking history, cough with haemoptysis, marked weight loss, emaciation, nicotine staining, generalized clubbing, and clinical signs of mass lesion on chest examination.

Differential diagnoses

- **Pulmonary TB** (usually present with cough, haemoptysis and weight loss. Absence of TB contact history or fever, gross clubbing, cervical lymphadenopathy with hard consistency; clinical signs of mass lesion on chest examination are against pulmonary TB)

DISCUSSION

▶ TYPES OF BRONCHIAL CARCINOMA

- Non-small-cell carcinoma 80%
- Small-cell carcinoma 20%

Histological types

- Squamous cell carcinoma 35%
- Small cell carcinoma 20%

} **Mnemonic CSS** (Central tumours: Small cell, Squamous cell)

- Adenocarcinoma 30%
- Large cell carcinoma 15%

} **Mnemonic PAL** (Peripheral tumours: Adenocarcinoma, Large cells

Adenocarcinoma: 10%

- Develops in lung periphery, usually in old lung scar
- Originates from mucous cells in the bronchial epithelium
- More common in elderly, females, non-smokers and in asbestosis
- Commonly invade to pleura and mediastinal lymph nodes
- Metastasize to brain, bones and adrenal glands

Small cell carcinoma: 20%

- Found proximally in the centre of lungs
- Originates from endocrine cells called Kulchitsky cells which secretes many polypeptide hormones that act in an autocrine fashion
- Rapidly growing, highly malignant tumor which metastasize early and is inoperable at presentation. The tumor is less likely to be cured by resection, however, responds to chemotherapy and radiotherapy.

Bronchoalveolar cell carcinoma: 1-2%

- Peripheral tumor
- Associated with expectoration of profuse mucoid sputum

▶ CLINICAL PRESENTATION

- Horner's syndrome: partial ptosis, miosis and enophthalmos, commonly found in Pancoast's tumour.

Due to lung lesion:

- ***Cough:*** any change in regular smoker's cough or bovine cough resulting from left recurrent laryngeal nerve paralysis.
- ***Hemoptysis***
- ***Breathlessness:*** may be caused by massive pleural effusion, bronchial obstruction, collapse or diaphragmatic paralysis due to phrenic nerve compression.
- ***Chest pain:*** caused by invasion of ribs, chest wall, intercostal nerves or brachial plexus.
- ***Recurrent non-resolving pneumonia:*** slow resolving pneumonia or pneumonia occurring repeatedly at the same site
- ***Pancoast's tumor:*** invasion of cervical sympathetic chain at or above the stellate ganglia, causing Horner's syndrome, pain in inner aspect of arm and shoulder due to the involvement of lower trunk of brachial plexus (Pancoast's syndrome)

Due to local spread in mediastinum:

- ***Hoarseness & bovine cough:*** caused by left recurrent laryngeal nerve invasion by left hilar lesion
- ***Stridor:*** caused by narrowing at lower trachea, carina or main bronchi by primary tumor or compression by paratracheal or subcarinal lymph nodes.
- ***Dysphagia:*** caused by esophageal invasion or compression by tumor

- ***SVC obstruction***
- ***Pericardial effusion or tamponade***

Distant metastasis (common in adenocarcinoma)

- Contralateral lung and lymph nodes, liver, adrenals, brain, bone

Nonmetastatic extra-pulmonary manifestations (Paraneoplastic syndrome) 15 - 20% cases

Symptoms of paraneoplastic syndrome are caused by secretory products released from the tumour which either may precede or coincide or follow the actual tumour symptoms itself. These symptoms improve once the primary tumour is treated.

- ***Endocrine***

• **ACTH secretion** →Cushing's syndrome	} small cell carcinoma
• **SIADH**	
• **Carcinoid syndrome**	
• **PTHrP** → hypercalcemia	Squamous cell carcinoma
• **Gynecomastia** (due to excess estrogen)	Large cell carcinoma

- ***Neurological***: (in all types):
    - Cortical degeneration (dementia)
    - Cerebellar degeneration
    - Sensorimotor peripheral neuropathy
    - Myelopathy: MND like features
- ***Musculoskeletal:***
    - Eaton-Lambert syndrome
    - Polymyositis or dermatomyositis (in all types)
    - Clubbing & hypertrophic osteoarthropathy (non-small-cell type)
- ***Hematological*** (in all types):
    - DIC
    - Migrating thrombophlebitis
- ***Heart*** *(in adenocarcinoma):*
    - Marantic endocarditis (thrombotic, non-bacterial or verrucous endocarditis)
- ***Skin*** *(in all types):*
    - Dermatomyositis
    - Acanthosis nigricans
- ***Renal:***
    - Membranous GN causing nephrotic syndrome
- ***Metabolic:***
    - Weight loss
    - Anorexia

▶ INVESTIGATIONS

- ***CXR:*** irregular homogenous opacity (sunray appearance), collapse, pleural effusion, rib erosion or destruction, hilar lymphadenopathy, and mediastinal widening
- ***Sputum for malignant (exfoliative) cytology***
- ***CECT chest***
- ***CT guided FNAC***
- ***FNAC or lymph nodes excision biopsy***
- ***Fibre optic bronchoscopic biopsy (or washing & brushing):*** Guide further management, enabling biopsy for histological diagnosis and visualizing the location of the mass.
    - Loss of sharp angle of carina and widening indicates presence of enlarged mediastinal lymph nodes. Lymph nodes biopsy can be taken during bronchoscopy by passing a needle through bronchial wall.
    - If first 2 cm of either main bronchus is involved it indicates inoperable tumor
    - Left vocal cord paralysis due to left recurrent laryngeal nerve paralysis indicates an inoperable tumor
- ***PET-CT scan:*** investigation of choice (highly sensitive and specific for mediastinal staging)

- ***For exclusion of metastasis:*** USG abdomen, CECT chest and abdomen, isotope bone scan,
- ***Other investigations:***
  - CBC, ESR
  - Pleural fluid diagnostic tap for cytology, and pleural biopsy
  - LFTs, RFTs
  - Pulmonary function test (25% mortality with DLCO <60% predicted)

▶ PANCOAST'S TUMOR AND PANCOAST'S SYNDROME

Pancoast's tumour (superior sulcus tumour)

- It is the apical lung tumor with propensity to invade the cervical sympathetic chain leading to Horner's syndrome.

Pancoast's syndrome

- The symptoms produced by Pancoast's tumor due to invasion of lower part of brachial plexus (C8, T1 & T2) causing pain in the inner aspect of arm along the ulnar nerve distribution or shoulder, and wasting of small muscles of hand from C8 & T1 nerve involvement; erosion and destruction of first and second ribs causing pain and tenderness with radiological evidence; and Horner's syndrome from sympathetic chain involvement as it traverses through T1 nerve root. Managed by combined surgical resection and radiotherapy.

▶ RISK FACTORS

- Smoking
- Exposure to products of coal combustion, silica, asbestos, chromium, cadmium, beryllium, arsenic, iron oxide, radiation, petroleum products

▶ TREATMENT OF BRONCHIAL CARCINOMA

Non-small-cell carcinoma

Chemotherapy is less helpful.

- ***Localized tumor (lobe or segment):*** Curative surgery if T1N0M0 stage
- ***Inoperable tumor:*** radiotherapy or chemotherapy or combined therapy
- ***Squamous cell type:*** radiotherapy for SVCO

Small-cell-carcinoma

Surgery has little role even in small tumors as >90% tumours have metastasis at the time of presentation.

- ***Chemotherapy:*** CDV intravenous (**C**yclophosphamide, **D**oxorubicin and **V**incristine) or CE (**C**isplatin, **E**toposide) every 3 weeks for 3 - 6 cycles. (Newer drugs docetaxel, paclitaxel, irinotecan, vinorelbine, gemcitabine) ±
- ***Radiotherapy:*** Continuous hyper-fractionated accelerated radiotherapy (CHART). Total dose of radiotherapy is given in in smaller but more frequent fractions. It offers the best survival.

Palliative treatments

- ***Endobronchial procedures with fiberoptic bronchoscopy:*** Tracheobronchial stenting, laser therapy, cryotherapy, brachytherapy (by placing a radioactive source close to the tumor)
- ***Radiofrequency thermal ablation (RFT):*** Helpful in bronchial carcinoma and hepatocellular carcinoma, if the tumor size is <4 cm. Under CT guidance a special needle is placed into the tumor and electric current is passed through the needle, which causes destruction of tumor by heat.
- ***Therapeutic pleural fluid tap or pleurodesis***
- ***Drug:***
  - **Steroids:** for appetite improvement
  - **Morphine or diamorphine:** for pain relieve
- ***Palliative radiotherapy:*** for bone pains, intractable cough or haemoptysis

*TNM classification (**for non-small-cell carcinoma**)*

Stages for T (Extent of primary tumor)

- **Tx:** Positive cytology only
- **T1:** <3 cm in diameter
- **T2:** >3 cm in diameter or partial atelectasis or invasion of visceral pleura or hilar region or main bronchus but remains $\geq$2 cm distal to carina
- **T3:** Involvement of chest wall, parietal pleura, diaphragm, mediastinum, pericardium or main bronchus <2 cm distal to carina; total atelectasis,
- **T4:** Malignant effusion, or involvement of carina, trachea, esophagus, heart, great vessels, or vertebral body

Stages for N (Lymph node involvement):

- **N0:** No nodal involvement
- **N1:** Intrapulmonary, peribronchial, ipsilateral hilar
- **N2:** Ipsilateral subcarinal or mediastinal
- **N3:** Contralateral mediastinal, scalene or supraclavicular

Stages for M (Presence of distant metastasis)

- **M0:** None
- **M1:** Distant metastasis

Contraindications of surgery

- Malignant pleural effusion; or involvement of carina, trachea, esophagus, heart, great vessels (central mediastinal structures); or vertebral body **(T4)**
- Contralateral mediastinal, scalene or supraclavicular lymph node involvement **(N3)**
- Distant metastasis **(M1)**
- Poor general condition, severe or unstable cardiac or other medical problem
- FEV_1 <0.8 L

Indications of radiotherapy

- **Curative treatment for:**
  - with chemotherapy in small cell carcinoma
  - Localized tumor where surgery is not possible
  - Pre- and post-surgery in selected patients
- **Palliative therapy for:**
  - Pain control
  - SVCO
  - Pancoast's tumor
  - Tracheal or main bronchial obstruction
  - Recurrent haemoptysis

▶ PROGNOSIS

The prognosis is good if tumor is resectable, otherwise

- **Small cell carcinoma:** median survival in untreated patients 3 months; with treatment 1 - 12 year.
- **Non-small-cell carcinoma:** disease without metastasis 2-years survival is 50%; with metastasis is 10%

▶ DIFFERENT BIOCHEMICAL TUMOUR MARKERS

- ***Calcitonin:*** medullary carcinoma of thyroid
- ***Thyroglobulin:*** papillary and follicular thyroid carcinoma
- ***β2 microglobullin:*** myeloma, NHL
- ***CA-19-9:*** pancreatic cancer
- ***Cancer antigen-125 (CA-125):*** ovarian cancer (75%), gastrointestinal cancer (10%), lung cancer (5%), breast (5%)
- ***Carcinoembryonic antigen (CEA):*** Colorectal cancer
- ***CA-15-3:*** breast cancer

- ***Prostate specific antigen (PSA):*** prostate carcinoma
- ***α-fetoprotein:*** HCC, non seminomatous germ cell tumor of gonads
- ***β human chorionic gonadotrophin (β-HCG):***
  - Choriocarcinoma (100%)
  - Hydatidiform mole (97%)
  - Ovarian non-seminomatous germ cell tumor (50 - 80%)
  - seminoma, lung cancer
- ***Placental alkaline phosphatase (PLAP):*** seminoma (40%), ovarian dysgerminoma (50%)
- ***Osteopontin:*** mesothelioma

11. Consolidation

▶ HISTORY (CHIEF COMPLAINTS)

Details of fever

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* **(Constant or intermittent)** *... How often does it peak in 24 hours?"* (high grade continuous fever associated with chills, rigors and profuse sweating)
- **Aggravating & relieving factors:** *"What makes it better?"* (antipyretics)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day?* (present throughout day and night) *...... Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** *...... How the phlegm looks like?"* (initially cough is dry, but later becomes productive with purulent or yellowish sputum)
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*
- **Associations (D/D):**
  - ***TB:*** *"Any evening fever with drenching sweats, weight loss, or contact with a TB patient?"*
  - ***Psittacosis:*** *"Any exposure to farm animals or birds?"*
  - ***Legionella / PJP pneumonia:*** *"Any history of traveling or unprotected sex?"*

Details of chest pain

- **Site:** *"Where exactly the chest pain is?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull?"*
- **Radiation:** *"Does it move anywhere else like your left arm, neck, jaw or back?"* (no radiation)
- **Association (D/D):**
  - ***IHD:*** *"Do you have chest pain at rest, or it appears on exertion? ... Does it stop after stopping exertion and returns on restarting? ... Does it appear on walking uphill or climbing stairs? ... How many meters can you walk on the flat before it appears?"*
  - ***Aortic dissection:*** *"Is it sudden onset severe tearing pain between your shoulder blades radiating to the neck or down to the back?"*
  - ***Musculoskeletal:*** *"Does it increase on pressing or movements?"*
  - ***Pleuritic:*** *"Does it worsen on taking deep breath in?"* ***(pulmonary embolism, pneumonia)***
  - ***Pericardial:*** *"Does it worsen on lying flat?"*
  - ***GERD:*** *"Any association with eating or hunger?"* ***(APD)***
  - ***Esophageal rupture:*** *"Did you have any recurrent vomiting before you developed chest pain?"*
  - ***Post herpetic neuralgia:*** *"Do you have any painful rash with clusters of blisters over your chest?"*
  - ***Spinal mass or disc herniation:*** *"Does it worsen on coughing or sneezing?"*
- **Timings:** *"Since how long you have the chest pain? ...Is it constant, or comes and goes?"*
- **Exacerbating /alleviating factors:** *"What makes it better? ..... What makes it worse?"* (exacerbate on deep breathing, coughing, and lying on the affected side)
- **Severity:** *"How bad is the pain on a scale of 1-10?"*

▶ GENERAL EXAMINATION

As per findings

- Toxic looking
- Pulse: 120/min

- Temperature: 103°F
- RR: 24/min
- ± Herpes labialis on the …… angle of mouth

▶ SYSTEMIC EXAMINATION

Respiratory System (Supposing in Right Side)

Inspection:

- **Chest movements:** Reduced on the right side of chest

Palpation:

- **Trachea:** central
- **Apex beat:** Not displaced (palpable in the 5th ICS, just medial to the left midclavicular line), normal in character
- **Chest expansion:** reduced slightly in …… part on the right side

Percussion:

- **Percussion note:** woody dull from ____ to _____ ICS on right side of the chest
- **Area of upper border of the liver dullness:** in the 5th intercostal space in right midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

- **Breath sounds:** bronchial breathing from____ to_____ ICS on the right side
- **Vocal resonance:** ↓with whispering pectoriloquy in the affected area
- **Added sounds:** occasional crepitations and pleural rub in the affected area

Examination of other systems

- No other abnormalities detected.

"My diagnosis is left sided consolidation."

Differential diagnoses

- **Lung abscess** (foul smelling profuse sputum, clubbing, coarse crepitations, air fluid level on CXR)
- **Pleural effusion**
- **Pulmonary TB** (low grade continuous fever with evening rise, night sweats, weight loss)
- **Bronchiectasis** (with secondary infection)

DISCUSSION

▶ DEFINITIONS

Consolidation (Pneumonia)

- It is the inflammation of the lungs leading to infiltration of inflammatory cells and accumulation of secretions.

▶ INVESTIGATIONS

- **CBC, ESR:**
    - ***Bacterial pneumonia:*** neutrophilic leucocytosis
    - ***Atypical pneumonia:*** normal or slightly increased leukocytes
    - ***Viral pneumonia:*** leukopenia
- **CRP**
- **CXR:** Homogenous opacity with air bronchogram (appears 12 - 18 hours after symptoms), parapneumonic effusion, cavitation (Staphylococcus aureus and pneumococcal serotype 3), hilar lymphadenopathy in mycoplasma pneumoniae.
- **Sputum microscopy, C/S**
- **Blood C/S** (positive in pneumococcal pneumonia)
- **ABGs**
- **Other investigations (according to suspected cause):**

- Serum for pneumococcal antigen
- Mycoplasma antibody (agglutination, CFT), Coomb's test
- Urine for legionella pneumophila antigen
- Antibody against virus, chlamydia, legionella

▶ TYPES OF PNEUMONIA

Anatomically types

- Lobar
- Bronchopneumonia

Clinical types

- Community acquired pneumonia (CAP)
- Hospital acquired pneumonia (nosocomial)
- Pneumonia in immunocompromised
- Aspiration and suppurative pneumonia

Other types

- Typical pneumonia
- Atypical pneumonia

A. Lobar pneumonia

- Fever
- Initially dry cough followed by rusty sputum expectoration during resolution (especially in Streptococcus pneumoniae infection).
- Pleuritic chest pain
- Dyspnoea
- Anorexia, nausea and vomiting (especially in atypical pneumonia)
- Clinical features of consolidation appear in 2 days and disappear after 2 weeks. During resolution phase crepitations appear in consolidation area. However, radiological features appear in 12 - 18 hours and usually disappear within 4 weeks.

B. Bronchopneumonia

- Diffuse patchy alveolar opacities caused by bronchial and bronchiolar inflammation, commonly involving lower lobes. Children have bronchopneumonia commonly as a complication of measles or whooping cough, while in elderly, it follows influenza or bronchitis.

C. Community acquired pneumonia (CAP)

Causative organisms

- ***Common organism:*** Streptococcus pneumoniae (50%), Legionella pneumophila, Chlamydia pneumoniae, Mycoplasma pneumoniae
- ***Others:*** Staph aureus, H. influenzae, Chlamydia psittaci, Klebsiella, Coxiella burnetii (Q fever), Actinomyces israelii, viral infections (influenza, parainfluenza, respiratory syncytial virus in infancy, measles and varicella)

Pathological stages

- ***Stage of congestion:*** persisting for 1 - 2 days
- ***Stage of red hepatization:*** (red and solid resembling liver) persisting for 2 - 4 days
- ***Stage of grey hepatization:*** persisting for 4 - 8 days
- ***Stage of resolution:*** persisting for 8 - 9 days or more

Markers of severity of pneumonia

- ***PaO_2:*** <8 kPa
- ***CXR:*** > 1 lobes involved
- ***TLC:*** <4,000 or >20,000 /cmm
- ***Albumin:*** <35 g/L
- ***Blood culture:*** Positive

Criteria for severity assessment (***CURB-65 score)***

Symptom	Points
Confusion (≤ 8MMSE score or new disorientation in time, place or person	1
Urea >7 mmol/L or >20 mg/dL	1
RR ≥30/minutes	1
SBP <90mmHg, DBP ≤60mmHg	1
Age ≥65	1

Score	Severity	Mortality (30 day)	Treatment	Antibiotics
0 - 1	Low	<3%	Outpatient	• Amoxicillin
2	Moderate	9%	Short stay in hospital or watch very closely as an outpatient	• Amoxicillin + clarithromycin • Benzylpenicillin + clarithromycin (If oral route not possible)
3 - 5	High	15-40%	Hospitalization, may require ICU admission	• IV Co-amoxiclav 1.2 g TDS + IV clarithromycin 500 mg BD • IV Co-amoxiclav / cefuroxime / cefotaxime + oral erythromycin/ clarithromycin

Indications for referral for ITU

- CURB score 3 - 5
- PO_2 < 8 kPa or 60 mm Hg despite high flow oxygen
- Progressive CO_2 retention
- Severe acidosis
- Shock
- Depressed consciousness

D. Nosocomial pneumonia

- Pneumonia occurring at least 48 hours after hospital admission.

Types

- ***Early onset:*** onset within 4-5 days of hospital admission (organisms like CAP)
- ***Late onset:*** onset after 4-5 days (Gram-ve Enterobacteriaceae like E coli, Pseudomonas aeruginosa and Klebsiella; Staph. aureus including MRSA; anaerobes)

Predisposing factors

- Elderly
- DM
- Immunocompromised: Use of steroid, cytotoxic drugs, antibiotics
- Unconsciousness
- Prolonged anaesthesia, post-thoracic or abdominal surgery
- Malignancy
- Achalasia cardia, dysphagia, bulbar or vocal cord palsy
- Nasogastric intubation

Treatment

- ***Empirical antibiotic therapy:*** to cover Gram-ve organisms
  - Third-generation cephalosporin (e.g. cefotaxime) + aminoglycoside (gentamicin) **OR**
  - Meropenem **OR**

        - Monocyclic beta lactam (e.g. aztreonam) + flucloxacillin
    - ***If MRSA suspected:*** Vancomycin IVI switching to linezolid PO when possible
    - ***If pseudomonas suspected:*** IV ceftazidime

E. Aspiration pneumonia

- Causative organisms are multiple including anaerobes.
    - IV Co-amoxiclav / cefuroxime + metronidazole
    - Physiotherapy and supplemental O_2, fluid support and monitoring

F. Typical pneumonia

- Presents with high grade fever, cough and pleuritic chest pain with physical signs of consolidation; respiratory symptoms are more pronounced than constitutional symptoms. Causative organisms are usually Streptococcus pneumoniae, Staphylococcus aureus, etc.

G. Atypical pneumonia (term atypical pneumonia is abandoned)

- Constitutional symptoms are more marked than respiratory symptoms. Causative organisms are mycoplasma, legionella, Coxiella, chlamydia. Clinical features include:
    - Low grade fever
    - Dry cough
    - Gradual onset
    - Constitutional symptoms (myalgia, fatigue, headache, nausea, vomiting) are more marked as compared to respiratory symptoms
    - Minimal clinical findings in the chest

1. Mycoplasma pneumoniae

- Common in children and young adult.
    - ***Respiratory features:***
        - Severe cough
        - Clinical signs minimal
    - ***Investigations:***
        - **CBC:** normal TLC
        - **CXR:** usually bibasal patchy consolidation
        - **Mycoplasma antibody titre:** Rising titres
        - **Cold agglutinin:** positive in 50% cases
    - ***Extrapulmonary complications:***
        - Erythema multiforme / Stevens Johnson syndrome
        - Haemolytic anaemia (positive Coombs test) & thrombocytopenia
        - GI symptoms: vomiting, diarrhoea
        - Myalgia and arthralgia
        - Myocarditis and pericarditis
        - Headache, meningoencephalitis, GBS
    - ***Treatment:***
        - Clarithromycin 500 mg BID PO or IV **OR**
          Erythromycin 500 mg 6 hourly PO or IV for 7-10 days **OR**
        - Doxycycline 100 mg PO BID
        - Rifampicin 600 mg PO BID

2. Legionella pneumophila

- Outbreak occurs from contaminated cooling system or water supply, or stagnant water in cisterns or shower's head.
    - ***Clinical features***
        - High grade fever with rigors and chills, headache, myalgia, malaise
        - Initially dry and later productive cough with purulent sputum
        - Extra-pulmonary symptoms: nausea, vomiting, diarrhoea, pain abdomen, confusion, renal failure

- ***Investigations:***
  - **CBC:** lymphopenia
  - **CXR:** Lobar or multilobar shadowing
  - **Hyponatremia**
  - **Serum aminotransferases:** Raised
  - **Urine for Legionella antigen:** highly specific
  - **Legionella serology:** rising tires (4-fold)
  - **Direct immunofluorescent for Legionella:** in sputum, bronchial washings or pleural fluid
  - **Cultures on special media:** may take 3 weeks
- ***Treatment:***
  - Erythromycin 500 mg QID PO or IV **OR** Clarithromycin 500 mg BID for 7-10 days
  - Rifampicin 600 mg BID
- ***Prognosis***
  - Mortality 10% (30% in elderly)

▶ TREATMENT OF PNEUMONIA

Start empirical treatment after sending sputum for C/S.

- ***General treatment:*** Chest physiotherapy, supplemental O_2 as needed, etc.
- ***Empirical treatment with antibiotics:*** send sputum for C/S before starting antibiotics
  - ***Community acquired pneumonia (CAP):***
    - **Mild:**
      - Oral amoxicillin 500 mg TID / clarithromycin 500 mg BID / azithromycin 500 mg OD / erythromycin 500 mg QID for 7- 14 days)
      - **If Staphylococcus aureus suspected:** add flucloxacillin 1-2 g IV QID for 7-14 days
      - **If Klebsiella suspected:** gentamycin 60-80 mg IV TID + Ciprofloxacin 200 mg IV BID **/** ceftazidime 1 g IV TID for 7-10 days (up to 14 days)
      - **For atypical organisms (Mycoplasma, Legionella):** Clarithromycin 500 mg BD PO / erythromycin 500 mg QID PO / tetracycline or doxycycline for 2 - 3 weeks.
    - **Moderate:**
      - Amoxicillin + clarithromycin **OR**
      - Benzylpenicillin + clarithromycin (If oral route not possible)
    - **Severe CAP:**
      - Erythromycin 500 mg IV QID / Clarithromycin 500 mg IV BID + any one of
        - Amoxicillin 1 g IV 6 hourly
        - Co-amoxiclav 1-2 g IV 8 hourly
        - Ceftriaxone 1-2 g IV OD
        - Cefuroxime 1.5 g IV 8 hourly
        - If Staph. aureus suspected: flucloxacillin 2 g IV QID

Criteria for discharge

- SBP >90 mm Hg
- Heart rate <100/min
- Temperature <37.8 °C
- RR <24/min
- SaO_2 >90%
- Tolerating orally

▶ COMPLICATIONS OF PNEUMONIA

- **Pulmonary:** Pleural effusion, lung abscess, empyema thoracis, pneumothorax (Staph aureus), collapse, ARDS, lung fibrosis
- **Cardiovascular:** Pericarditis, myocarditis, endocarditis, arrhythmia
- **Neurological:** meningoencephalitis
- **Musculoskeletal:** Septic arthritis
- **Others:** Septicaemia, hepatitis, ARF
- Immunocompromised state (HIV, DM, haematological malignancy)

▶ PRECIPITATING FACTORS OF PNEUMONIA

- Influenza or parainfluenza viral infections (predisposes to streptococcus pneumonia)
- Hospitalized patient with comorbid
- Bronchiectasis
- Bronchial obstruction
- Immunosuppression
- IV drug abuser
- Smoking
- Alcohol excess
- Aspiration due to oesophageal obstruction

▶ CAUSES OF SLOW RESOLOVING PNEUMONIA

In slow resolving pneumonia, there is persistence of clinical signs > 2 weeks and radiological features > 4 weeks despite treatment. In non-resolving pneumonia, there is persistence of radiological opacity > 8 weeks despite treatment. Causes are:

- Incorrect microbiological diagnosis
- Inappropriate or insufficient dose of antibiotics
- Pneumonia caused by Fungal, tubercular or atypical organisms
- Bronchial obstruction due to malignant lesion or foreign body
- Atelectasis or empyema

▶ CAUSES OF RECURRENT PNEUMONIA ($\geq$ 3 SEPARATE ATTACKS)

- **Bronchial obstruction:** bronchial adenoma, carcinoma, foreign body
- **Pre-existing lung disease:** cystic fibrosis, bronchiectasis, lung abscess, sequestrate segment of lung commonly left lower lobe
- **Aspiration:** pharyngeal pouch, scleroderma, achalasia cardia
- **Immunocompromised state:** DM, HIV, haematological malignancy

▶ BACTERIAL VS VIRAL PNEUMONIA

Topic	Bacterial pneumonia	Viral pneumonia
Onset	Abrupt with high grade fever associated with chills & rigors	Less abrupt onset with low grade fever, URTI, headache
Cough	Initially dry cough followed by rusty or purulent sputum	Usually dry cough with more pronounced non-respiratory symptoms
Pleuritic chest pain	Common	Less common
Clinical signs of consolidation	Well-marked	Minimal
CBC	Leucocytosis	Leukopenia
CXR	Homogenous lobar or segmental opacity with air bronchogram	patchy or streaky opacities
Culture	Organism found	No organism

12. Pneumothorax

▶ HISTORY (CHIEF COMPLAINTS)

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"* (Sudden onset severe breathlessness)
- **Progression:** *"Is it getting worse over time?"* (non-progressive)
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"*
- **Aggravating factors:** *"What makes it worse?"* (aggravates on lying flat as well as lying on affected side)
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"* (not relieved by rest or drugs)
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***Pneumothorax:*** Sudden onset breathlessness associated with chest pain
  - ***Asthma/COPD/ chronic bronchitis:*** *"Do you smoke? .... Do you have intermittent or progressive shortness of breath with cough and wheeze? .... Do you have more breathlessness, wheeze and cough in the mornings; or there is no day to day variability?"* (in asthma symptoms are Intermittent with morning dipping, history of atopy/allergy; in COPD, symptoms are progressive without daily variation along with smoking history)
  - ***IHD:*** *"Any history of shortness of breath on lying flat or sudden awakening from sleep due to breathlessness?"* **(orthopnea or PND)**

Details of chest pain

- ***Site*:** *"Where exactly the chest pain is?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull?"*
- **Radiation:** *"Does it move anywhere else like your left arm, neck, jaw or back?"* (no radiation)
- ***Association:***
  - ***IHD:*** *"Do you have chest pain at rest, or it appears on exertion? ... Does it stop after stopping exertion and returns on restarting? ... Does it appear on walking uphill or climbing stairs? ... How many meters can you walk on the flat before it appears?"*
  - ***Aortic dissection:*** *"Is it sudden onset severe tearing pain between your shoulder blades radiating to the neck or down to the back?"*
  - ***Musculoskeletal:*** *"Does it increase on pressing or movements?"*
  - ***Pleuritic:*** *"Does it worsen on taking deep breath in?"* ***(pulmonary embolism, pneumonia)***
  - ***Pericardial:*** *"Does it worsen on lying flat?"*
  - ***GERD:*** *"Any association with eating or hunger?"* ***(APD)***
  - ***Esophageal rupture:*** *"Did you have any recurrent vomiting before you developed chest pain?"*
  - ***Post herpetic neuralgia:*** *"Do you have any painful rash with clusters of blisters over your chest?"*
  - ***Spinal mass or disc herniation:*** *"Does it worsen on coughing or sneezing?"*
- **Timings:** *"Since how long you have the chest pain? ...Is it constant, or comes and goes?"*
- **Exacerbating /alleviating factors:** *"What makes it better? ..... What makes it worse?"* (worse with inspiration and during coughing, with movements and lying on affected side)
- **Severity:** *"How bad is the pain on a scale of 1-10?"*

Details of cough

- **Duration:** *"Since how long you have cough?"*
- **Progression:** *"Is it getting worse over time?"*

- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day? ...... Does it also affect your sleep?* (present throughout day and night) ...... *How much phlegm you are coughing up?* **(Quantify)** ...... *How the phlegm looks like? ... Is it mucoid or purulent?* (cough with slight mucoid expectoration but no haemoptysis)
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*

▶ GENERAL EXAMINATION

As per findings

- Dyspnoeic
- Patient prefers to lie on left lateral position (decubitus position)
- **Respiratory rate:** 34/min

▶ SYSTEMIC EXAMINATION

Respiratory System (Supposing Right Side)

Inspection:

- **Chest movements:** Restricted on right side with fullness of intercostal spaces

Palpation:

- **Trachea:** deviated to the left
- **Apex beat:** displaced to left (palpable in the left 6th intercostal space in anterior axillary line, normal in character
- **Chest expansion:** reduced on the right side

Percussion:

- **Percussion note:** Hyper-resonant on the right side (tell where), but normal on the left side
- **Area of upper border of the liver dullness:** in the right 6th intercostal space in midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

- **Breath sound:** diminished (or absent) on right side of the chest (tell up to which space), but vesicular on the left side
- **Vocal resonance:** diminished (or absent) on the right side of the chest (tell up to which space), but normal on the left side

Examination of other systems

- No other abnormalities detected

"My diagnosis is right sided pneumothorax."

Differential diagnoses

- Big pulmonary cavity
- Large bullae

DISCUSSION

▶ DEFINITIONS:

- It is the presence of air in the pleural cavity.

▶ CLINICAL PRESENTATION

- Sudden onset unilateral pleuritic chest pain
- Breathlessness
- Clinical Signs of pneumothorax: Hyper-resonance percussion note, diminished or absent breath sounds

- **Coin test:** in pneumothorax if a coin is placed on the front or back of the chest and struck with edge of another coin, a metallic bell like sound will be heard with the stethoscope on opposite side of chest at the same level.

▶ INVESTIGATIONS

- CXR
- CT scan chest

Size of pneumothorax

- **Mild:** small rim of air around the lung (radiographic volume 20%)
- **Moderate:** lung collapse (radiographic volume 20-50%)
- **Large:** lung collapse (radiographic volume >50%)

▶ CAUSES

A. Spontaneous:

Primary (no pre-existing pulmonary disease)

- **Causes:**
  - ***Rupture of apical sub-pleural bleb:*** Common cause of pneumothorax in young. Pulmonary blebs are small subpleural thin walled air containing spaces (1-2 cm in diameter), very common finding in otherwise normal healthy young, tall and thin individuals. Pulmonary blebs are formed by congenital defect in the connective tissue of alveolar walls. Their rupture may lead to pneumothorax.
  - ***Rupture of emphysematous bullae or pulmonary end of pleural adhesion***

Secondary (with pre-existing pulmonary disease)

- **Causes**
  - Chronic bronchitis with emphysema (Common cause >40 years), COPD, asthma
  - Post-TB lung
  - Fibrotic lung diseases
  - Bronchiectasis, cystic fibrosis
  - Lung abscess
  - Bronchial carcinoma
  - Ehlers-Danlos syndrome, Marfan's syndrome, and eosinophilic granuloma

B. Traumatic

Iatrogenic

- During thoracocentesis, lung biopsy or pleural biopsy, subclavian vein catheterization, thoracic surgery, mechanical ventilation (high positive pressure ventilation) etc.

Chest wall trauma

▶ TYPES OF SPONTANEOUS PNEUMOTHORAX

A. Closed

Communication site between lung and pleural space is sealed off after air leakage. Air trapped in pleural space is slowly reabsorbed in 2-4 weeks and the lung re-expands. It may be mild, moderate or large.

B. Open

Communication site between the lung and pleural space (bronchopleural fistula) persists which prevents lung re-expansion. There is development of hydropneumothorax, superadded infection and empyema finally. Clinical signs of hydropneumothorax are present.

- **Causes:**
  - Rupture of emphysematous bullae
  - Small pleural bleb
  - Tuberculous cavity
  - Lung abscess bursting into pleural cavity

C. Valvular

Communication site between pleural space and lung turns into a one-way valve that allows air entry into the pleural space during inspiration but prevents air escape during expiration. Intrapleural pressure progressively rise, rising more than the atmospheric pressure leading to lung compression, mediastinal shift towards the opposite side, compression of great vessels /heart and the other lung as well. Compression of SVC reduces venous return. Rapidly progressive dyspnea, cyanosis and shock develops. It requires prompt treatment being a medical emergency.

- ***Tension pneumothorax:*** there is cardiorespiratory compromise and signs of shock.

▶ RECURRENT PNEUMOTHORAX (MORE THAN TWICE)

Causes

- Fibrotic lung disease
- Cystic fibrosis
- Rupture of apical sub-pleural blebs or cysts (congenital)
- Rupture of emphysematous bullae
- Marfan's syndrome, Ehlers-Danlos syndrome, alpha-1 antitrypsin deficiency
- Histiocytosis X
- Catamenial pneumothorax

Treatment:

- ***Chemical pleurodesis:*** tetracycline (500 mg), talc or kaolin is injected through intercostal tube into the pleural space.
- ***Surgical pleurodesis:*** pleural abrasion or parietal pleurectomy is done by VATS or thoracotomy. It is indicated in:
    - Recurrent pneumothorax (after a second pneumothorax)
    - first secondary pneumothorax but with low respiratory reserve
    - Patient desirous of continuing activity like flying or diving which could endanger life if there is recurrence of episode

Avoid pleurodesis in cystic fibrosis as there might be requirement of lung transplantation in future.

Open thoracotomy indications

- Bilateral pneumothorax
- Recurrence (usually third time)
- Failure to re-expand >5 days post-tube thoracotomy

▶ CATAMENIAL PNEUMOTHORAX

It occurs during menstruation (within 48 hours of onset) due to intrapleural endometriosis, usually right sided.

Treatment:

- Suppression of ovulation by hormone therapy (progesterone, androgen or OCPs)
- Surgical exploration and pleurodesis (occasionally)

▶ TENSION PNEUMOTHORAX

A valvular type of pneumothorax in which trapped air pressure in intra-pleural space rises greater than atmospheric pressure resulting in cardiorespiratory compromise; it is medical emergency requiring prompt treatment.

Clinical features:

- Severe chest pain
- Cough
- Progressively worsening severe breathlessness, tachypnea, central cyanosis
- Pulses paradoxus
- Shock (hypotension, tachycardia)
- Raised JVP, engorged neck vein
- Mediastinal shift to the opposite side

Causes:

- Traumatic
- Mechanical ventilation (high positive pressure ventilation)
- Spontaneous pneumothorax

Treatment:

- ***Needle thoracostomy:*** a wide bore needle is inserted immediately in 2nd ICS in midclavicular line in the sitting position. The trapped air will escape producing an audible hiss. If working in a remote place, refer to closest hospital after securing the cannula with tape.
- ***Tube thoracostomy:*** Chest tube is inserted in 4th, 5th or 6th ICS in midaxillary line. For pneumothorax, the tube is advanced towards apex and connected to one-way Heimlich valve or an underwater seal.
  - Repeat CXR, if bubbling in the underwater seal stops. If the lung has re-expanded, remove the intercostal tube during expiration or Valsalva manoeuvre 24 hours later. Do not clamp the tube before removing.
  - If lung has not re-expanded or there is continuous bubbling > 5-7 days, go for surgical treatment.
- Prop up the patient and give supplemental oxygen
- Give morphine 5-10 mg S/C

If under water seal drainage is working properly, there is

- Air bubbling in water
- ↑ bubbling on coughing and expiration
- Water column ascends in the tube during inspiration

Patient having under water seal must be advised

- To keep the bottle below the level of thorax and never raise it above the chest wall
- Incentive spirometry (inflate balloons or use incentive spirometer for expansion of collapsed lung)

Indications of tube thoracostomy

- Empyema thoracis or complicated parapneumonic effusion
- Hydropneumothorax
- Malignant pleural effusion
- Tension pneumothorax
- Postoperatively (thoracotomy, esophagectomy, cardiothoracic surgery)
- Large 2nd spontaneous pneumothorax if > 50 years

▶ TREATMENT OF PNEUMOTHORAX

- **Small primary pneumothorax:**
  - Resolve spontaneously. Repeat CXR / follow-up after 2-weeks.
  - Avoidance of strenuous exercise
- **Moderate to large primary pneumothorax + dyspnea**: Percutaneous needle aspiration of air (2-5 litres). Stop, if there is resistance to suction or cough.
- **Secondary pneumothorax:** Respiratory failure can result even due to small pneumothorax in COPD patients. Therefore, tube thoracostomy should be done with under water seal drainage.
- **Open pneumothorax:** Surgical management
- **Tension pneumothorax** (as discussed earlier)

Patient must be advised to

- Quit smoking
- Avoid air travel for 6 weeks after normalization of CXR
- Avoid diving permanently

Time for lung re-expansion

Rate of absorption of air is 1.25% /day of the total radiographic volume, therefore 40 days are required to re-expand a 50% lung collapse.

Causes of failure of lung to re-expand

- Water seal drainage is blocked or not working properly
- Bronchopleural fistula
- Obstruction of major bronchus
- Completely fibrosed and permanently damaged lung

▶ HYDROPNEUMOTHORAX

It is the fluid and air accumulation in the pleural cavity.

Clinical signs

- Signs of pleural effusion in the lower chest, but signs of pneumothorax in upper chest
- Succussion splash

Causes

- Iatrogenic (during pleurocentesis)
- Thoracic surgery /penetrating injury
- Rupture of lung abscess
- Pulmonary TB
- Erosion of bronchial carcinoma
- Esophageal rupture
- Bronchopleural fistula

Management:

- Under water seal drainage and treat the primary cause.

13. Collapse of lung

▶ HISTORY (CHIEF COMPLAINTS)

Details of cough

- **Duration:** *"Since how long you have cough?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day? ...... Does it also affect your sleep? ...... Is it dry or with phlegm? ... How much phlegm you are coughing up?* **(Quantify)** ...... (Severe dry cough)
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"* (Cough worse in lying position, aggravated on dust and cold exposure)

Details of breathing difficulty

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"* (Sudden onset severe breathlessness)
- **Progression:** *"Is it getting worse over time?"* (non-progressive)
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"* (Breathlessness on moderate to severe exertion)
- **Aggravating factors:** *"What makes it worse?"* (aggravates on lying flat as well as lying on affected side)
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"* (not relieved after taking rest)
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- **Association (D/D):**
  - ***Pneumothorax:*** Sudden onset breathlessness associated with chest pain
  - ***Asthma/COPD/ chronic bronchitis:*** *"Do you smoke? .... Do you have intermittent or progressive shortness of breath with cough and wheeze? .... Do you have more breathlessness, wheeze and cough in the mornings; or there is no day to day variability?" (in asthma symptoms are Intermittent with morning dipping, history of atopy/allergy; in COPD, symptoms are progressive without daily variation along with smoking history)*
  - **IHD:** *"Any history of shortness of breath on lying flat or sudden awakening from sleep due to breathlessness?"* **(orthopnea or PND)**

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
  - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)
  - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency?"*
  - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
  - ***DM:*** *"Any increased frequency of water works or increased thirst?"*

▶ GENERAL EXAMINATION

As per findings

- Ill-looking and emaciated
- Generalized clubbing, but no hypertrophic osteoarthropathy
- Dyspnoeic with RR: 28/minutes

▶ SYSTEMIC EXAMINATION

Respiratory System (Assume right sided collapse)

Inspection:

- Drooping of right shoulder
- **Chest movements:** Reduced with flattening on the right upper chest and rib crowding

Palpation:

- **Trachea:** Shifted to the right
- **Apex beat:** displaced to the right (mention location)

Percussion:

- **Percussion note:** Dull in the right upper chest (mention location)
- **Area of upper border of the liver dullness:** in the 5th ICS in the right midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

Collapse with patent bronchus:

- **Breath sounds:** Bronchial breathing in the right upper chest (mention location)
- **Added sounds:** occasional coarse crepitations in the right upper chest (mention location)
- **Vocal resonance:** ↑ in right upper chest, whispering pectoriloquy is present.

Collapse with obstructed bronchus:

- **Breath sounds:** ↓ or Absent in right upper chest (mention location)
- **Added sounds:** occasional coarse crepitations in the right upper chest (mention location)
- **Vocal resonance:** ↓ or Absent in the right upper chest.

Examination of other systems

- No other abnormalities detected

"My diagnosis is right sided lung collapse with patent (or obstructed) bronchus."

Differential diagnosis

- **Lung fibrosis** (As lung fibrosis being a chronic process there is flattening of chest, crowding of ribs and drooping of shoulder on the affected side; albeit, similar findings may also be present in a collapse if present for a prolong period but with less severity)

DISCUSSION

▶ INVESTIGATIONS

- **CXR PA view** (lateral view if needed)
  - *Collapse:* Homogenous opacity with clear lung margins; shifting of heart and lung shadow to the affected side; raised diaphragm; mass lesion ±
  - *Fibrosis:* Non-homogenous fibrotic shadowing, rib crowding
- CT scan chest
- Bronchoscopy (to remove foreign body or aspiration of any material, or for taking biopsy)

▶ TYPES OF COLLAPSE

Etiologically:

- *Compression collapse:* Compression causes collapse of lung with tracheal and apex beat shift to the opposite side
  - *Causes:*
    - Pleural effusion
    - Pneumothorax
    - Hydropneumothorax
- *Absorption collapse:* results from bronchial obstruction causing absorption of air distal to the obstruction site and collapse of relevant lung part

- *Causes:*
  - Bronchial carcinoma
  - Foreign body
  - Mucous plug (bronchial asthma, ABPA, cystic fibrosis)
  - External compression on bronchus (enlarged lymph node, aortic aneurysm, enlarged left atrium in mitral stenosis, pericardial effusion)
  - Congenitally absent surfactant

Anatomically:

- ***Central collapse:*** Completely obstructed bronchus causing large collapse of lung; clinical signs include reduced or absent breath sounds, reduced or absent vocal resonance.
  - ***Causes:*** bronchial adenoma or carcinoma, foreign body, enlarged lymph nodes
- ***Peripheral collapse:*** Bronchus is patent with small collapse; clinical signs include bronchial breath sounds, increased vocal resonance.
  - ***Causes:*** mucus plugging, bronchial cast

Common etiologies among different age groups

- ***Neonate:*** congenital absence or low surfactant, meconium aspiration
- ***Children:*** foreign body
- ***Adult:*** bronchial adenoma and foreign body

▶ MIDDLE LOBE SYNDROME

- It is the recurrent or chronic atelectasis of right middle lobe. Anatomically, the origin of right middle lobe is at an acute angle, with surrounding lymph nodes. Any lymph nodes enlargement due to malignancy or TB, or foreign body can obstruct and collapse the lobe; finally ending in bronchiectatic changes.

Investigations:

- CXR: wedge-shaped density that extends anteriorly and inferiorly from the hilum of the lung, best visualized in the lateral view
- CT scan chest
- Bronchoscopy

14. Superior vena cava (SVC) obstruction

HISTORY (CHIEF COMPLAINTS)

Details of cough

- ***Duration:*** "Since how long you have cough?"
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more marked? ...... Does it persist throughout the day? ...... Does it also affect your sleep? ...... Is it dry or with phlegm? ... How much phlegm you are coughing up?* ***(Quantify)*** (Usually dry cough with scanty mucoid phlegm may contain small amount of blood)
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*
- **Association (D/D):**
  - ***TB:*** *"Any evening fever with drenching sweats, weight loss, or contact with a TB patient?"*
  - ***Bronchial carcinoma:*** *"Any coughing of blood with chest pain, shortness of breath, weight loss or loss of appetite, swallowing difficulty, hoarseness of voice? Any work history as a plumber or on shipyard?"*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
  - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)
  - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency?"*
  - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
  - ***DM:*** *"Any increased frequency of water works or increased thirst?"*

Details of swelling of face and arms

- **Duration:** *"Since how long you have swelling of arms and face?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How far your swelling extends? ... Forearms, arms, face?"*
- **Aggravating factors:** *"What makes it worse? ..... After lying or bending forward?"* (Symptoms aggravates on bending forward or lying down)
- **Relieving factors:** *"What makes you feel better? ... Does it disappear on waking in the morning?"*
- **Association:** *"Is it associated with any shortness of breath? ...... Any change in voice?"*

Details of headache

- **Site:** *"Where exactly the pain is?"* (mostly the vertex)
- **Onset:** *"Since how long you have the pain? ..... Is it constant or comes and goes? ...... Is it getting worse over time?"*
- **Character of pain:** *"What type of pain it is? ... Feeling of tight band around head, throbbing or excruciating?"*
- **Radiation:** *"Does it move anywhere like back of head or neck?"*
- **Timings:** *" At what time of the day it is more marked?* (More marked in the morning) ...... *Does it persist throughout the day?"*

  Exacerbating/alleviating factors: *"What makes it worse?* (aggravated by coughing and head movement) ...... *What makes it better? ... Any relief from painkillers?"*
- **Severity:** *"How bad is the pain on a scale of 1-10? ...... Does it wake you up from sleep?"*

GENERAL EXAMINATION

As per findings

- Looks emaciated
- **Face:** plethoric, edematous, cyanosed

- **Eyes:** conjunctival edema (chemosis), blood shot eyes (red congested conjunctiva), periorbital edema
- **Neck veins:** non-pulsatile engorged veins
- **Visible tortuous veins over chest and abdomen** with downwards flow
- **Upper limbs:** edematous with prominent engorged veins
- Generalized clubbing but no hypertrophic osteoarthropathy
- **Dyspnoeic with RR:** 28/min.

▶ SYSTEMIC EXAMINATION

Respiratory System (Assuming Right sided)

Inspection:

- **Chest movements:** ↓ in the right upper chest
- **Chest and abdomen:** Visible tortuous veins with downwards flow

Palpation:

- **Trachea:** central in position
- **Apex beat:** Not displaced (palpable in the left 5th ICS, 9 cm away from midsternal line), normal in character

Percussion:

- **Percussion note:** dull in the right upper chest
- **Area of upper border of the liver dullness:** in the 5th ICS in right midclavicular line
- **Area of cardiac dullness:** normal

Auscultation:

- **Breath sounds:** ↓ in right upper chest
- **Vocal resonance:** ↓ in the same area
- **Added sounds:** ± Occasional crepitations (mention location)

Fundoscopy

- Dilated blood vessels, exudate, haemorrhage, rarely papilledema

Examination of other systems

- No other abnormalities detected.

"My diagnosis is superior vena cava obstruction."

(The most likely cause of recent onset SVC obstruction is malignancy while the most likely cause of long-standing SVCO is non-malignant)

DISCUSSION

▶ CLINICAL PRESENTATION

Clinical features

Clinical features of mediastinal compression:

Symptoms aggravating on bending forward or lying down shows mediastinal involvement.

- **Tracheal compression**: stridor, breathlessness, cough
- **Involvement of recurrent laryngeal nerve:** Bovine cough, hoarseness
- **Involvement of phrenic nerve:** dyspnea (raised hemidiaphragm on CXR)
- **Cervical sympathetic chain involvement:** Horner's syndrome
- **Esophageal compression**: dysphagia
- **Bronchus compression**: symptoms of lung collapse
- **SVC compression:**
    - *Face:* puffy, oedematous and flushed
    - *Neck:* engorged, swollen and non-pulsatile neck veins
    - *Chest and abdomen:* tortuous visible veins with downwards flow
    - *Upper limbs:* edematous with prominent engorged veins

Other features:

- Headache worst in the early morning, aggravated by coughing
- Blackout, dizziness or syncope; seizure; stupor (caused by ↑ICP)

Clinical signs

- **Chest:** bronchial carcinoma (also look for clubbing and nicotine staining)
- **Lymphadenopathy:** lymphoproliferative disorder and metastasis
- **Hepatosplenomegaly:** lymphoproliferative disorder
- **Thyroid:** examine for retrosternal thyroid enlargement
    - ***Pemberton's sign:*** ask the patient to raise the arms overhead for more than one minute. Facial plethora and cyanosis will be increased; JVP will rise (non-pulsatile) and inspiratory stridor will appear.

▶ INVESTIGATIONS

- CXR (single most important investigations to establish the diagnosis)
- CECT chest
- Sputum for malignant cytology
- FNAC or lymph node excision biopsy (if lymphadenopathy)
- Bronchoscopy and mediastinoscopy
- Echocardiography
- Base line investigations

▶ CAUSES OF SVC OBSTRUCTION

- Bronchial carcinoma (75% cases), mediastinal metastasis
- Lymphoma (both in early age and elderly)
- Retrosternal thyroid
- Thymoma
- Esophageal carcinoma
- Giant aortic aneurysm
- Mediastinal fibrosis (idiopathic, radiation, methysergide)

▶ CAUSES MORTALITY

- Respiratory obstruction
- Intracranial haemorrhage

▶ MANAGEMENT

General management:

- ***Edema:*** raising of head, IV frusemide, dexamethasone
- ***Relieving obstruction:*** Placement of expandable metallic stent in SVC
- ***Venoplasty***
- ***Anticoagulation***

Management of cause:

- ***Bronchial carcinoma:*** Non-small cell carcinoma is managed with radiotherapy; small cell carcinoma is managed with chemotherapy.
- ***Lymphoma:*** chemotherapy as per guidelines

15. Cystic fibrosis

HISTORY (CHIEF COMPLAINTS)

Details of cough with phlegm

- **Duration:** *"Since how long you have cough with phlegm?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"How bad it is? ...... At what time of the day it is more severe?* (more marked after waking from sleep in the morning) ...... *Does it persist throughout the day? ...... Does it also affect your sleep? ...... How much phlegm you are coughing up?* **(Quantify)** (moderate sputum) ...... *How the phlegm looks like?"*
- **Aggravating factors:** *"Any aggravating or triggering factors like exposure to cold or dust?"*
- **Associations (D/D):**
  - ***COPD:*** *"Do you smoke?" (smoking history)*
  - ***Childhood or previous infections:*** pulmonary TB, whooping cough, or foreign body impaction
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*

Details of difficulty in breathing

- **Duration:** *"Since how long you have difficulty in breathing?"*
- **Onset:** *"Did it develop suddenly or gradually?"*
- **Progression:** *"Is it getting worse over time?"*
- **Severity:** *"Do you have breathlessness on walking or even at rest? ... How much distance can you walk on flat at normal pace before stopping? ... And before your illness? .... How many flight of stairs can you walk up before stopping? ... And before your illness? .... Are you short of breath while doing activity of daily living?"* (not related to physical exertion)
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes you feel better? ... Is it relieved by rest?"*
- **Ever had it before:** *"Have you ever had it before? ... Any previous admission in the hospital due to shortness of breath?"*
- ***Association (D/D):***
  - ***COPD:*** *"Do you smoke?" (smoking history)*
  - ***LVF:*** *"Any chest pain, breathlessness on lying flat (orthopnea), night-time awakening due to breathlessness, or swelling of the ankles?"*
  - ***TB:*** *"Any fever, night sweats, weight loss or coughing up any blood?"*

Details of fever

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* **(Constant or intermittent)** *... How often does it peak in 24 hours?"* (high grade continuous fever associated with chills, rigors and profuse sweating)
- **Aggravating & relieving factors:** *"What makes it better?" (antipyretics)*
- ***Association (D/D):***
  - ***Cystic fibrosis:*** Recurrent respiratory tract infections and progressive breathlessness since childhood; loose, bulky stools; family history of similar problem.

GENERAL EXAMINATION

As per findings (Must have a look at the bedside for sputum pot)

- Slightly emaciated
- Generalized clubbing, but no hypertrophic osteoarthropathy

▶ SYSTEMIC EXAMINATION

Respiratory System

Inspection:

- **Chest movements:** reduced symmetrically both above and below

Palpation:

- **Trachea:** Central in position
- **Apex beat:** Palpable in left 5th ICS medial to the left midclavicular line, normal in character
- **Chest expansion:** Normal

Percussion:

- **Percussion note:** Normal
- **Area of liver and cardiac dullness:** normal

Auscultation:

- **Breath sounds:** Vesicular breathing (if bronchial mention where)
- **Added sounds:** Scattered bibasal coarse crepitations, present equally in inspiration and expiration; which reduces or clears on coughing.
- **Vocal resonance:** Slightly ↑ (tell location)

Examination of other systems

- No other abnormalities detected.

"My diagnosis is bronchiectasis, most likely due to cystic fibrosis."

DISCUSSION

It is an autosomal recessive genetic disorder caused by defect in chloride and sodium ions channels in salivary glands, intestine, pancreas & bile ducts; nasal epithelium and lungs, resulting in production of thick, viscous secretions causing recurrent respiratory infections and pancreatic insufficiency.

▶ CLINICAL FEATURES

- **In neonates**: meconium ileus, failure to thrive, rectal prolapse
- **In children & young adults:**
  - ***Respiratory:*** recurrent chest infections, lung abscess, bronchiectasis, lobar collapse, pneumothorax, cor pulmonale, respiratory failure, sinusitis, otitis media, haemoptysis
  - ***Abdominal:*** DM, steatorrhea, malabsorption, meconium ileus equivalent syndrome (small intestinal obstruction resulting from viscid intestinal secretions and steatorrhea, leading to faecal impaction in in ileocecal junction or ascending colon), cholesterol gallstones
  - ***Male infertility:*** due to failure of development of vas deferens and epididymis About 20% of female in this condition are also infertile.

▶ INVESTIGATIONS

- **Sweat test:** Sweat Na^+ and Cl^- concentration > 60 mmol/L
- **BSR**
- Genetic analysis
- **CXR and CT chest:** features of bronchiectasis
- **Scrotal and testicular USG:** Absent vas deferens and epididymis
- **Baseline investigations**
- **Other investigations**
  - Vitamin A, D, E levels
  - OGTT (annual)
  - Lung function tests: obstructive defect
  - Faecal elastase

▶ TREATMENT OF CYSTIC FIBROSIS

General management:

- Smoking cessation
- Influenza and pneumococcal vaccination
- Nutritional and fat-soluble vitamin supplements
- Strict glycemic control
- Genetic counselling
- Treatment of osteoporosis and infertility

Management of lung disease: (Pseudomonas aeruginosa most common pathogen)

- ***Regular chest physiotherapy:*** forced expiratory techniques, active cycle techniques, postural drainage
- ***Antibiotics for infective exacerbations:*** oral flucloxacillin or nebulized colomycin or tobramycin
- ***Symptomatic relief:*** Mucolytics, bronchodilators, inhaled corticosteroid, inhalation of recombinant DNase or hypertonic saline
- ***Supplemental Oxygen***
- ***Pulmonary rehabilitation***
- ***Heart-lung or lung transplantation***

For abdominal problems:

- ***Pancreatic enzymes replacement***
- ***For acute intestinal obstruction:***
  - NPO, IV fluids and nasogastric suction
  - Acetylcysteine IV or via NG tube
- ***Ursodeoxycholic acid***
- ***Liver transplantation in cirrhosis***

▶ PROGNOSIS

- median survival over 30 years

III. RHEUMATOLOGY

1. Rheumatoid arthritis

▶ HISTORY (CHIEF COMPLAINTS)

Details of Joint pains

- *"Which joints are painful?* **(small or large joints)** *...... Are they swollen as well?* **(arthralgia or arthritis)** *...... Do you have pain in any other joints as well?"*
- *"Does it involve both the sides at the same time?"* **(Symmetrical or asymmetrical)** (symmetrical arthritis of small joints of both hands and feet; wrists, shoulders, knees)
- *Do you have pain in your back as well?"* (no involvement of back)

- **Duration:** *"Since how long you have the problem?"* (more than or less than 6 weeks)
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, writing, using cutlery, social life and work, e.g. typing? ... Does it persist throughout the day and night? ... Does it affect your sleep?"* (pain is more marked in the morning)
- **Aggravating factors:** *"What makes it worse? ... activity or rest?"*
- **Relieving factors:** *" What makes it better? ... activity or rest?"* (relieved by activity or exercise)
- **Associations (D/D):**
  - ***Symmetrical arthropathy:***
    - ***RA:*** *"Are your joint stiff when you woke up? ... Is it more than or less than 06 weeks duration?"* ***(morning stiffness)***
    - ***SLE & drug induced lupus*** *(Procainamide or hydralazine)**:*** *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
    - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*
  - ***Asymmetrical:***
    - ***Seronegative spondyloarthropathies:*** *"Is pain and stiffness in your back associated with ...?"*
      - ***Ankylosing spondylitis***
      - ***Enteropathic arthropathy (IBD):*** *"Any loose bowel works?"*
      - ***Psoriatic arthropathy:*** *"Any scaly skin rash?"*
      - ***Reactive arthritis:*** *"Any stinging in your water or recent loose stools?"*
        Reiter's syndrome: *asymmetrical DIP joint arthropathy, uveitis, urethritis*
    - ***Gout:*** *"Do you have any acute attacks of joint swelling? ... What triggers the attack? ... How often the attacks are?"*
    - **Rheumatic fever**

Details of fever

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* **(Constant or intermittent)** *... How often does it peak in 24 hours?"* (low grade continuous fever not associated with chills and rigors)
- **Aggravating & relieving factors:** *"What makes it better?"* (antipyretics)

▶ GENERAL EXAMINATION

As per findings

- **Nail fold infarcts or skin rash or digital ulceration:** absent

▶ SYSTEMIC EXAMINATION

A. Musculoskeletal System

Hands:

Inspection:

- **Joints:**
  - *Swelling:* swollen wrist joints; swollen spindle shaped PIP joints in both hands
  - *Deformity:* flexion deformity of fingers in right/left hand as manifested by prayer sign, Swan-neck (flexed DIP, hyperextended PIP) or Boutonnières (hyperextended DIP, flexed PIP) deformities in fingers; Z deformity in thumb; subluxation and ulnar deviation of wrist and MCP joints.
  - *Joint replacement scars*
- **Muscle wasting:** Dorsal guttering, wasting of thenar and hypothenar muscles in both hands.
- No pulp infarction, gangrene, or rash anywhere.

Movements:

- Fingers and wrists movements in both hands are restricted with slight impairment of hand functions

Palpation:

- **Joints:** small joints of both hands are tender
- **Rheumatoid nodules:** palpable on the extensor surface of the forearm

Feet:

Inspection:

- **Joints:**
  - *Swelling:* all MTP and IP joints swollen in both feet
  - *Deformity:* deformed MTP and IP joints; dorsal subluxation and lateral deviation of toes; plantar subluxation of the metatarsal heads; hallux valgus; plantar erythema

Knees and elbows:

- **knee joints:** swollen and tender with fixed flexion deformity, no evidence of Baker cyst
- **Elbow joints:** swollen and tender with some fixed flexion deformity

B. Eyes

- No redness

C. Respiratory system

- Normal (No bibasal crepitations)

D. CVS

- No abnormality detected

E. Neurological examination

- No evidence of carpal tunnel or tarsal tunnel syndrome, peripheral neuropathy.

F. Abdomen

- No splenomegaly (for exclusion of Felty's syndrome)

"My diagnosis is rheumatoid arthritis."

Based on bilaterally symmetrically involved small peripheral joints associated with morning stiffness lasting >1 hour, with sparing of distal interphalangeal joints.

Differential diagnosis (if history/clinical findings are typical of RA, no D/D needed)

- Seronegative arthritis (usually asymmetrical involvement of the bigger joints)
- SLE
- Mixed connective tissue disease (MCTD)

DISCUSSION

▶ DIAGNOSTIC CRITERIA

American College of Rheumatology (ACR) & European League Against Rheumatism (EULAR) 2010

score ≥ 6 diagnostic

A. ***Joint involvement:*** (swelling or tenderness ± radiological evidence)
- ***Large joints:*** shoulders, elbows, hip joints, knees and ankles
    - 1 large joint = 0 points
    - 2 - 10 large joints = 1 point
- ***Small joints:*** MCP, PIP, IP of thumb, wrist, 2-5th MTP joints
    - 1 - 3 small joints (with or without involvement of large joints) = 2 points
    - 4 - 10 small joints (with or without involvement of large joints) = 3 points
    - >10 joints (with involvement of at least 1 small joint) = 5 points

B. ***Duration of arthritis***
- Symptoms lasting ≥ 6 weeks = 1 point

C. ***Serological markers***
- Negative RF and Anti-CCP Ab = 0 points
- Low-positive RF or anti-CCP Ab= 2 points
- High-positive RF or Anti-CCP Ab = 3 points

Anti CCP levels:
Negative: < 20 EU/mL
Weakly positive: 20-39 EU/mL
Moderately positive: 40-59 EU/mL
Strongly positive: >60 EU/mL

RA factor:
sensitivity 75% in RA; 100% sensitivity if extra-articular manifestations
Positive in 20% of normal population

D. ***Acute phase reactants:***
- Elevated ESR or CRP = 1 point

ARA criteria for disease activity in RA

- Number of joints tender
- Number of joints swollen
- Duration of morning stiffness
- Patient's global assessment
- Physician global assessment
- VAS (visual analog scale for pain)
- ESR or CRP
- Functional assessment health status (HAQ: health assessment questionnaire)

High titres of rheumatoid factor indicates:

- Poor prognosis
- Severe erosive disease
- Extra-articular manifestations
- Rheumatoid nodules, vasculitis, Felty's syndrome

▶ CLINICAL PRESENTATION

- **Chronic persistent (65-70%)**
- **Rapidly progressive (5%)**
- **Palindromic type (5%):** Recurrent attacks of monoarthritis of peripheral joint lasting 24-48 hours without any permanent joint damage and systemic features except fever. Differential diagnosis include acute gouty attack or atypical onset of RA. 35-50% cases develops RA.
- **Remitting Seronegative Symmetrical Synovitis with Pitting Edema (RS3PE) (5-10%):** a rare clinical entity formerly considered as a subset of RA but now regarded as a distinct disease.

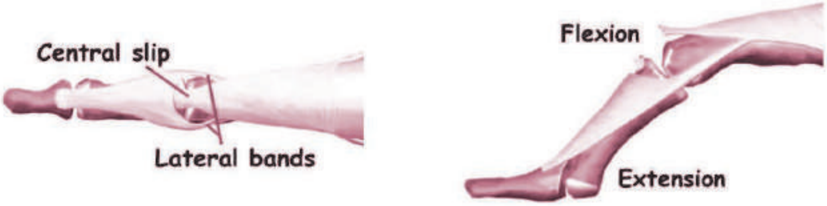
Malignant RA

- Severe RA with systemic features/ vasculitis along with severe extra-articular manifestations

▶ JOINT DEFORMITIES

Boutonniere deformity

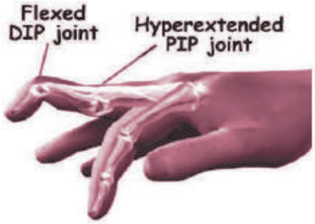
Central slip of extensor tendon of PIP joint ruptures due to chronic synovitis and the joint protrudes between the two lateral slips of tendon resembling the gap of buttonhole (therefore, named as boutonniere or button-hole deformity). There is fixed flexion at PIP joint and extension at DIP.


Central slip
Lateral bands
Flexion
Extension

Swan neck deformity

Extensor tendon of DIP joint ruptures because of chronic synovitis resulting in flexion at DIP joint; intrinsic muscles of hands shortens exerting tension over dorsal tendon sheath resulting in stretching of volar plate at PIP joint and PIP joint hyperextension. There is fixed extension at PIP joint and flexion at DIP joint (reverse of boutonniere).

Volar plate
Radial collateral ligament
Volar plate


Flexed DIP joint
Hyperextended PIP joint

Z-deformity of thumb

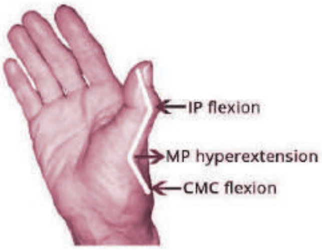
Hyperextension at IP joint and; fixed flexion and subluxation at MCP joints of thumb due to chronic synovitis.

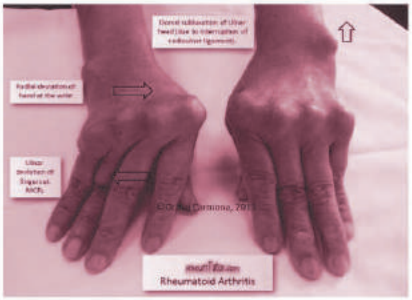
Radial drift at wrist

Extensor carpi ulnaris weakness rotates carpal bones towards radial side causing radial deviation at wrist joint.

Ulnar drift of MCP joints

Radial deviation at wrist causes ulnar deviation at MCP joints to keep the tendons to the phalanges in normal line to the radius.


IP flexion
MP hyperextension
CMC flexion


Rheumatoid Arthritis

RHEUMATOID NODULES (20 - 30% CASES)

Painless, firm, subcutaneous nodules which may ulcerate and become infected.

Sites:

- **Pressure points:** elbows, extensor surface of forearms/fingers & scapula; sacrum, shin, Achilles tendon & toes; scalp; lungs, pleura & pericardium; sclera.

Clinical significance:

Associated with:

- Active and aggressive disease
- High titre of rheumatoid factor
- Bad prognosis

Histology: (3 zones)

- **Central zone:** necrotic material
- **Mid zone:** palisading macrophages
- **Outer zone:** granulation tissue

D/D:

- Gouty tophi, neurofibroma, sarcoid nodule, xanthomata, olecranon bursa in elbow.

Treatment:

- Surgical removal or local corticosteroid injection

BAKER'S CYST

This cyst is formed behind the knee joint having connectivity to the joint space; albeit, a valve mechanism prevents cyst fluid returning to the joint space. Knee flexion may rupture the cyst and fluid may trickle down into calf muscle causing severe pain, swelling and tenderness that may mimic DVT.

Causes:

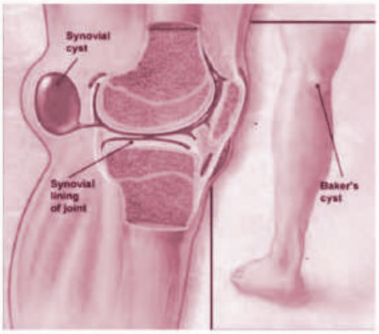
- RA
- Osteoarthrosis
- Congenital (rare)

Investigations:

- USG/ CT scan / MRI of affected knee joint
- Arthrogram

Treatment after rupture of Baker's cyst:

- Pain relief with NSAIDs
- Lower limb elevation
- Antibiotics if required
- Intra-articular injection methylprednisolone or triamcinolone
- Surgical toilet and removal of cyst



EXTRA-ARTICULAR MANIFESTATIONS

Eyes:

- Episcleritis, scleritis, scleromalacia, scleromalacia perforans, keratoconjunctivitis sicca

Respiratory:

- ***Pleuritis, pleural effusion, fibrosing alveolitis, bronchiolitis***
- ***Caplan's syndrome:*** Pneumoconiosis with rheumatoid nodules (found at the lung periphery). Rupture of nodule may cause pneumothorax and cavitation of nodule may cause hemoptysis.

CVS:

- Pericarditis, myocarditis, conduction defect, aortitis, aortic regurgitation, coronary vasculitis

Vasculitis:

- Digital ulcers, nail fold infarct, Raynaud's phenomenon, visceral arteritis, pyoderma gangrenosum

Neurological:

- Peripheral neuropathy, mononeuritis multiplex, entrapment neuropathy (carpal tunnel and tarsal tunnel syndrome), cervical cord compression (due to atlanto-axial subluxation), cervical myelopathy

Haematological:

- ***Anaemia:***
  - **Anaemia of chronic disorder:** normocytic normochromic
  - **Megaloblastic anaemia:** results from folate or vitamin B_{12} deficiency, or pernicious anaemia
  - **Iron deficiency anaemia:** results from NSAIDs or vasculitis induced GIT bleeding
  - **Haemolytic anaemia:** positive coombs' test
  - **Hypersplenism** (Felty's syndrome)
  - **Gold and penicillamine induced marrow suppression** (not used now a days)
- ***Felty's syndrome:*** It is RA with splenomegaly and neutropenia; found in < 1% cases of longstanding (≥ 10 years) seropositive deforming but inactive RA at 50-70 years of age. There is association with high titers of RA factor, rheumatoid nodules and other systemic manifestations.
  - **Clinical features:**
    - features of hypersplenism (anaemia, leukopenia and thrombocytopenia)
    - Leg ulcers or sepsis due to neutropenia
  - **Investigations:**
    - red cell sequestration study
  - **Treatment:**
    - Pulsed corticosteroid and/or cyclophosphamide
    - Switching / intensification of DMARD
    - Splenectomy in non-responders

▶ INVESTIGATIONS

- CBC (high ESR, pancytopenia if Felty's syndrome)
- RA factor
- Anti-CCP antibody (cyclic citrullinated peptide): specificity 95%, sensitivity 70%
- X-ray:
  - Hands & other involved joints
  - CXR: Lung fibrosis, pleural effusion, rheumatoid nodules
- CRP (high)
- Urinary proteins (to rule out renal amyloidosis)

▶ TREATMENT

- **Symptomatic treatment:** rest, NSAIDs, intra-articular steroid injection, splint, hydrotherapy, physiotherapy
- **Specific treatment to suppress the disease activity and progression:** Disease modifying anti-rheumatic drugs (DMARDs)
- **Surgical treatments:**
  - Synovectomy of tendon sheaths of fingers or wrist (to relieve pain or to prevent rupture of tendons)
  - Arthrodesis, arthroplasty and osteotomy in advanced disease

Precaution before upper GI endoscopy or GA

- Always exclude atlanto-axial subluxation with X-ray cervical spine; which may lead to catastrophic events of cervical cord compression and sudden death during anaesthesia.

Criteria for remission of RA

(must fulfil minimum of 5 criteria for minimum of 2 consecutive months)

- No joint pain
- No joint tenderness
- No soft tissue swelling
- Morning stiffness < 15 minutes
- No fatigue

- ESR < 30 mm in 1st hour

Bad or poor prognostic factors

Clinical:

- Female sex
- Severe functional impairment
- Insidious onset
- Active disease without remission for 01 year
- ↑ involvement of peripheral joints
- Early development of rheumatoid nodules
- Extra-articular manifestations

Blood tests:

- ↑↑ anti-CCP antibodies and RA factor titres
- ↑↑ CRP
- Normochromic normocytic anaemia

X-rays:

- For detection of early erosive disease (joint USG & MRI detect bone or cartilage damage before the changes appear on conventional X-rays)

DMARDs

- *Sulfasalazine and methotrexate are first choices. Other drugs used are leflunomide, hydroxychloroquine, azathioprine, and cyclosporine (penicillamine and gold are not used now)*
- *Start with DMARD, effect may take 4-12 weeks. If no response in 6-12 weeks, start combination therapy with methotrexate and sulfasalazine. Add prednisolone for symptomatic relief (7.5 -10 mg).*

a. Methotrexate:

A dihydrofolate reductase competitive inhibitor, which acts by interfering DNA synthesis and cell division.

- ***Dose:*** 7.5 - 10 mg weekly (up to 25 mg). Effect may take 4-6 weeks. Give folic acid 5 mg OD on the next day, however, folinic acid is preferred.
- ***Side effects:*** Anorexia, nausea, vomiting (give anti-emetic before commencing treatment), bone marrow suppression; hepatic fibrosis & DPLD (with prolong use)
- ***Periodic check-up:*** CBC, LFTs (SGPT) and RFTs (creatinine)

b. Sulfasalazine:

After oral intake, it breaks down into sulfapyridine and 5-amino salicylic acid (ASA). Sulfapyridine is effective in RA by inhibiting cyclo-oxygenase (COX) and other enzymes involved in prostaglandin synthesis. (ASA is effective in IBD)

- ***Dose:*** First week 250 mg (1/2 tablet) BID; second week 500 mg (1 tablet) BID; maintenance dose 1,000 mg (2 tablets) BID (maximum 2 - 3 g daily).
- ***Side effects:*** skin rash, Stevens Johnson syndrome, GIT upset, reversible male infertility, blood dyscrasias (megaloblastic anaemia, haemolytic anaemia and agranulocytosis).
- ***Periodic check-up:*** CBC; LFTs (SGPT) and RFTs (creatinine) every 1-3 months

c. Hydroxychloroquine:

- *As monotherapy for mild RA, or as an adjuvant with other DMARDs*
- ***Dose:*** 200 - 400 mg daily
- ***Side effects:*** Retinopathy (rare before 6 years of treatment)

d. Leflunomide:

- *Use if no response to methotrexate fails to respond either alone or in combination with methotrexate.*
- ***Dose:*** start with 100 mg OD for 3 days, then 10-20 mg OD
- ***Side effects:*** Carcinogenic and teratogenic; skin rash, diarrhea, reversible alopecia, hepatotoxicity. Being teratogenic, wash out period in males is 3 months, while in females it is 2 years before conception. Therefore, it must be avoided in women who desire to be pregnant.
- ***Periodic blood check-up***

Biological agents:

- *Anti-TNF alpha, IL-1 and rituximab are more efficacious in preventing joint erosions than DMARDs. Consider anti-TNF therapy if the disease is active despite an adequate trial of 02 DMARDs.*

a. *Anti-TNF α:*

- ***Infliximab:*** 1-2 monthly IVI
- ***Etanercept:*** Fortnightly SC
- ***Adalimumab:*** Fortnightly SC

Common side effects: reactivation of latent TB, allergic reactions, hypotension, headache, lymphoma

b. *Interleukin (IL-1) receptor antagonist:*

- ***Anakinra:*** Consider treatment with IL-6 receptor antagonist if no response to anti-TNF α. However, it is not as efficacious as anti-TNF. May be combined with methotrexate.

c. *Interleukin 6 (IL-6) receptor antagonist:*

- ***Tocilizumab*** **(***humanized monoclonal antibody against IL-6 receptor***):** Used as monotherapy or in combination with methotrexate and/or other DMARDs for moderate to severe active RA. Given by IVI 8 mg/kg every 4 weeks.

d. *Rituximab (anti-CD20 monoclonal antibody expressed on B lymphocytes):*

- Used as monotherapy or in combination with methotrexate or steroids. Given by two IVI (1 g each) 2 weeks apart with significant improvement.

▶ SJÖGREN'S SYNDROME

Types:

- ***Primary (sicca syndrome):*** not associated with collagen disease
- ***Secondary:*** associated with collagen disease

Presentation of primary Sjogren's syndrome

- Xerostomia (dryness of mouth)
- Keratoconjunctivitis sicca (dryness of eyes)
- Arthralgia and non-erosive arthritis
- Raynaud's phenomenon
- Dysphagia
- Lung fibrosis
- Renal tubular acidosis, nephrogenic diabetes insipidus
- Neuropathy, fits, depression
- Non-Hodgkin's B cell lymphoma (40-fold increased risk)
- Association with other autoimmune diseases (myasthenia gravis, thyroid disease, autoimmune hepatitis, PBC)

Investigations:

- ***Schirmer test:*** a filter paper strip is placed inside the lower eyelid to check for wetting. Normally in healthy individuals, the strip is wet at least 6 mm in 5 minutes. In Sjögren's syndrome it is <5 mm.
- ***Salivary gland or lip biopsy:*** plasma cell and lymphocytic infiltration
- ***Rose Bengal eyes' staining:*** punctate or filamentary keratitis
- ***Antibody test:***
  - Positive RA in 90%
  - Positive ANA in 60 - 70%
  - Positive anti-Ro (SS-A) in 70% (it crosses placenta resulting in congenital complete heart block)
  - Anti-La (SS-B)

Treatment: Treat primary cause

- ***Eye dryness:*** artificial tear, contact lens, Hydroxychloroquine (2 to 3 mg/kg daily)
- ***Oral dryness:*** Sugar free chewing gum or lozenges, oral gel, artificial saliva, oral hygiene
- ***Oral candidiasis:*** needs to be treated promptly
- ***Vaginal dryness:*** lubricants, such as K-Y jelly
- ***Steroids, immunosuppressive drugs***

2. Systemic lupus erythematosus

▶ HISTORY (CHIEF COMPLAINTS)

Details of Joint pains

- *"Which joints are painful?* **(small or large joints)** *...... Are they swollen as well?* **(arthralgia or arthritis)** *...... Do you have pain in any other joints as well?"* (pain and swelling of multiple small and large joints involving both upper and lower limbs, but predominantly affecting lower limbs)
- *"Does it involve both the sides at the same time?"* **(Symmetrical or asymmetrical)**
- *Do you have pain in your back as well?"* (no involvement of back)

- **Duration:** *"Since how long you have the problem?"* (more than or less than 6 weeks)
- **Progression:** *"Is it worsening with time?*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, writing, using cutlery, social life and work, e.g. typing? ... Does it persist throughout the day and night? ... Does it affect your sleep?"* (persistent pain during day and night, but more severe after waking in the morning)
- **Aggravating factors:** *"What makes it worse? ... activity or rest?"*
- **Relieving factors:** *" What makes it better? ... activity or rest?"* (relieved by activity or exercise)
- **Associations (D/D):**
  - ***Symmetrical arthropathy:***
    - ***RA:*** *"Are your joint stiff when you woke up? ... Is it more than or less than 06 weeks duration?"* ***(morning stiffness)***
    - ***SLE & drug induced lupus*** *(Procainamide or hydralazine)*: *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
    - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*
  - ***Asymmetrical:***
    - ***Seronegative spondyloarthropathies:*** *"Is pain and stiffness in your back associated with ...?"*
      - ***Ankylosing spondylitis***
      - ***Enteropathic arthropathy (IBD):*** *"Any loose bowel works?"*
      - ***Psoriatic arthropathy:*** *"Any scaly skin rash?"*
      - ***Reactive arthritis:*** *"Any stinging in your water or recent loose stools?"*
        Reiter's syndrome: *asymmetrical DIP joint arthropathy, uveitis, urethritis*
    - ***Gout:*** *"Do you have any acute attacks of joint swelling? ... What triggers the attack? ... How often the attacks are?"*
    - **Rheumatic fever**

Details of skin rash

- *"Where exactly the rash is? .... Do you have rash anywhere else?* ***(site)***
- *"How does it look like? ... Can you feel it? ... Does it disappear when you press it?"* ***size, colour, shape (flat or raised), blanchability, itchy (Description)*** (skin rash over the face, arms and legs)

- **Duration:** *"Since how long it has been present?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Ever had it before:** *"Have you ever had the rash before?"*
- **Aggravating or relieving factors:** *"Does it aggravate on exposure to sunlight?"*

Details of fever

- **Duration:** *"Since how long you have fever?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"Have you measured your temperature? ... How high does it go? ... Is it present all the times or comes and goes?* ***(Constant or intermittent)*** *... How often does it peak in 24 hours?" (low grade continuous fever not associated with chills and rigors)*

- **Aggravating & relieving factors:** *"What makes it better?" (antipyretics)*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- ***Severity:*** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Association (D/D):**
    - ***Dieting:*** *"Is there any change in your appetite?"* (Take dietary history)
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood, night sweats?"*
    - ***DM:*** *"Any increased frequency of water works or increased thirst?"*

▶ GENERAL EXAMINATION

As per findings

- **Alopecia:** over scalp
- **Photosensitive skin or butterfly (malar) rash:** erythematous rash over the face involving the cheeks, nasal bridge, sparing the nasolabial folds. Maculopapular skin rashes are also present over other sun exposed areas including the dorsum of the hands and legs.
- **Painless oral ulcers:** over the inner side of lips and cheeks

▶ SYSTEMIC EXAMINATION

Musculoskeletal system

- **Joints:**
    - ***Swelling:*** swollen and tender both knee, ankle, wrist, MCP and IP joints of both hands
    - ***Deformity:*** no deformity

Examination of other systems

- No other abnormalities detected

My diagnosis is systemic lupus erythematosus.

Differential diagnoses

- Dermatomyositis
- Mixed connective tissue disease (MCTD)
- Sarcoidosis
- RA (No photosensitive skin or butterfly rash in RA; involved joint are deformed)

DISCUSSION

Lupus is derived from Latin word meaning wolf and the term systemic lupus erythematosus is termed due to erosive nature of SLE which appears like injury inflicted by bites of a hungry wolf. Common in 2nd & 3rd decades.

▶ INVESTIGATIONS

- **CBC:** anaemia, leukopenia, thrombocytopenia, lymphopenia and high ESR
- **CRP:** normal (↑CRP indicates infection)
- **Complements:** ↓C_3 and C_4 indicates active disease
- **Immunoglobulins:** ↑ titres of IgM and IgG
- **ANA:** +ve in 95% of cases (it is the most sensitive screening test)
- **Anti-double-stranded DNA:** +ve in 30-50% of cases (highly specific for SLE)
- **Anti- Smith (Sm) Ab:** +ve in 10 - 25% of cases (more specific in SLE)
- **Anti-phospholipid Ab:** anticardiolipin antibody / lupus anticoagulant (**C**oagulation defect, **L**ivedo reticularis, **O**bstetrics (repeated abortion), **T**hrombocytopenia: **CLOTS**)
- **Anti-histone Ab:** +ve in drug induced lupus
- **Anti-Ro/La:** results in congenital heart block in neonates

- **Anti-Cit Ab:** prognostic significance in lupus nephritis
- **Others** (indicate presence of antiphospholipid antibody):
  - *VDRL:* false positive
  - *PT & APTT:* prolonged and not corrected by adding normal plasma
- **For suspected renal involvement**:
  - *Urine:*
    - Proteinuria (+++), haematuria, and RBC or granular cast
    - 24 hours urinary protein > 0.5 g
  - *RFTs, creatinine clearance*
  - *Renal biopsy*
- **Skin biopsy:**
  - *Immunofluorescence:* immune complex deposition at dermo-epidermal junction (lupus band)
- **For suspected CNS involvement**: EEG, CT or MRI

▶ DIAGNOSTIC CRITERIA

Presence of ≥4 criteria either sequentially or at a time; or positive anti-Ds DNA and anti-Sm Ab are diagnostic of SLE.

1. Malar rash (erythematous rash over face involving cheeks and nasal bridge but sparing the nasolabial folds)
2. Discoid rash (raised erythematous rash with follicular plugging and adherent keratotic scarring)
3. Photosensitivity
4. Oral ulcer (painless)
5. Arthritis (Non-erosive and non-deforming arthritis usually, rarely deforming Jaccoud's arthropathy due to involvement of joint capsule. Aseptic or avascular necrosis of head of femur may occur because of vasculitis or prolonged use of steroid)
6. Serositis:
   - Pleuritis (pleuritic pain, rub or pleural effusion)
   - Pericarditis (pericardial rub, pericardial effusion, ECG evidence)
7. Renal involvement:
   - Persistent proteinuria > 0.5 g per day, or
   - > 3 + proteinuria (if 24 hours urinary protein is not done), or
   - Cellular casts (granular, red cell or tubular)
8. Neurological disorder: Psychosis or seizures without any offending drug or metabolic derangements (electrolyte imbalance, ketoacidosis, uraemia)
9. Haematological disorders:
   - Haemolytic anaemia or
   - Leukopenia (< 4,000/cmm on two or more occasions) or
   - Lymphopenia (< 1,000/cmm in two or more occasions) or
   - Thrombocytopenia (< 100,000/cmm on two or more occasions), in the absence of offending drug
10. Immunological disorders:
    - Anti-Ds DNA antibody +ve **OR**
    - Anti-Sm Ab +ve **OR**
    - Anti-phospholipid Ab +ve **OR**
    - False +ve non-specific serological tests for syphilis (positive for at least 6 months and confirmed by negative treponema pallidum immobilization or fluorescent treponemal antibody absorption test)
11. ANA +ve

According to American Rheumatism Association (ARA) criteria:

- **Possible SLE:** Presence of 2 criteria
- **Probable SLE:** Presence of 3 criteria
- **Definite SLE:** Presence of ≥ 4 criteria
- **Definite SLE:** Presence of ≥ 4 criteria
- **Classic SLE:** Presence of many criteria

Disease severity:

Mild:

- Fever
- Arthralgia or arthritis
- Rash
- Headache
- Mild pericarditis or mild pericardial/pleural effusion

Severe:

- Massive pericardial / pleural effusion
- Renal or CNS involvement
- Lupus pneumonitis
- Myocarditis
- Haemolytic anaemia / Thrombocytopenic purpura
- Acute vasculitis

Variants of SLE

Disseminated lupus erythematosus (DLE)

Mostly limited to the skin manifested as photosensitivity, erythema, discoid rash, scaling, follicular plugging and telangiectasia. SLE may occur in 5% cases.

- ANA +ve in 30% of cases
- Anti-double-stranded DNA -ve
- Normal complements

Treatment of DLE:

- Hydroxychloroquine 200 - 400 mg/day
- Prednisolone in severe cases
- Sunscreen and topical steroid

SCLE (subacute cutaneous lupus erythematosus)

It is a highly photosensitive red scaly patch resembling psoriasis. Anti-Ro (SSA) Ab is +ve mostly.

Drugs induced SLE

Causes:

- Hydralazine, procainamide, anticonvulsant (carbamazepine and phenytoin), phenothiazine, isoniazid, OCPs, ACE inhibitor, penicillamine, methyldopa, minocycline

Features of drug induced SLE:

- Sex ratio equal
- Lungs involvement common
- No renal and neurological involvements
- Positive ANA, but negative anti-ds DNA
- Complements normal
- Anti-histone antibody positive in 95% cases
- Drugs which causes drug induced SLE usually do not exacerbate primary SLE
- Reversal on stopping the offending drug

Treatment:

- Withdrawal of offending drug
- Occasionally a short course of steroid

▶ PREGNANCY WITH SLE

- Fertility is normal but there are repeated abortions, still births and IUGR, particularly if associated with anti-phospholipid antibody syndrome.
- The disease should be in remission for pregnancy. Avoid conception if there is CNS, cardiac or renal involvement. During first trimester and puerperium, the disease may relapse.
- There is 2% risk of developing neonatal lupus syndrome characterized by skin rash, hepatitis and congenital heart block, if mother is +ve for 'anti-Ro Ab' (SSA) due to transplacental transfer of antibodies.

Treatment of SLE during pregnancy:

- Continue prednisolone, but betamethasone and dexamethasone are avoided as these are degraded by placental enzymes.

▶ LUPUS NEPHRITIS

1/3rd cases of SLE develop lupus nephritis, out of these 25% develop ESRF within 10 years.

WHO classification

Type	Histology	Clinical features	Treatment
Type I	**Minimal** mesangial LN (light microscopy normal)	Asymptomatic	No treatment required
Type II	**Mesangial** proliferative LN (mesangial hypercellularity and matrix expansion)	Mild renal disease	Benign but steroid may be needed sometimes
Type III	**Focal** LN (involving < 50% glomeruli)	Haematuria & proteinuria	**Induction**: immunosuppression with steroid and cyclophosphamide or mycophenolate mofetil **Maintenance**: azathioprine & mycophenolate mofetil (Good response to prednisolone 40 to 60 mg/day)
Type IV	**Diffuse** LN (involving ≥ 50% glomeruli)	Nephrotic syndrome, renal insufficiency, hypertension (most severe & most common form)	" Response to steroids only is not adequate. Methylprednisolone pulse therapy for 3 days and then prednisolone maintenance therapy is necessary. Sometimes azathioprine 2 - 3 mg/kg body weight or cyclophosphamide 100 - 150 mg daily with prednisolone may be given.
Type V	**Membranous** LN	Nephrotic syndrome, haematuria, hypertension (Good prognosis)	" Response to steroids only is not adequate. Methylprednisolone pulse therapy for 3 days and then prednisolone maintenance therapy is necessary. Sometimes azathioprine 2 - 3 mg/kg body weight or cyclophosphamide 100 - 150 mg daily with prednisolone may be given.
Type VI	Advanced **sclerosis** (of > 90% glomeruli)	Progressive renal failure (severe form)	"

Rituximab (anti CD-20) may be used in some patient

- **Pulse therapy:** Pulse IV cyclophosphamide is more effective than pulse methylprednisolone alone. Sometimes, combination therapy is more effective. Continuing IV therapy after renal remission quarterly for one year reduces the risk of renal flare.
- Type I, II and V have better prognosis.

▶ MANAGEMENT

General measures:

- Educate the patient the chronic nature of the disease
- Reassure and provide psychological support
- Avoid exposure to direct sunlight (UV light) and ensure sunblock use

Drug therapy:

- **Mild cases:** NSAIDs
- **Skin rash, arthritis/arthralgia, serositis without organ involvement:** Chloroquine or hydroxychloroquine
- **Skin rash, synovitis, pleuro-pericarditis:** Short course of steroids
- **Severe & active disease:** steroids

- **Acute life-threatening SLE** (renal, CNS, CVS, or haematological involvement)**:** high dose steroids and immunosuppressants. Pulse methylprednisolone 500 - 1000 mg IV OD for 3 - 5 days. Give cyclophosphamide 2 mg/kg IV every 2 - 3 week on 6 - 8 times.
- **Renal involvement:** Use mycophenolate mofetil instead of cyclophosphamide
- **Thrombocytopenia non-responsive to immunosuppressants:** danazol

Prednisolone:

Indications:

- Mild disease, non-responsive to chloroquine and NSAIDs
- Severe and active disease with organ involvement (CNS, heart, kidneys and haematological)

Dose:

- ***No major organ involved:*** 0.25 - 0.5 mg/kg/day
- ***Major organ involved:*** 1 - 1.5 mg/kg/day

- **Dose regimen:**
  - Start 45 - 60 mg/day for 4 - 8 weeks; reduce to 30 mg by decreasing 10 mg weekly; then reduce to 15 mg by decreasing 5 mg weekly and continue 15 mg for a month; then reduce 2.5 mg after every 2 week as follows:
    - For 2 weeks, first day 15 mg & second day 12.5 mg, then
    - For next 2 weeks, first day 15 mg second day 10 mg, then
    - Continue 15 mg on alternate day and follow-up

Steroids may need to be continued for 2-3 years. when the disease is in remission, tapper and withdraw steroids gradually over months. Give treatment for 5 years in lupus nephritis.

Methylprednisolone:

Indication:

- Severe SLE (CNS, cardiac, renal involvement)

Dose:

- 500 mg - 1 gm in 200 mL 5% dextrose water IVI daily for 3 - 5 days, then prednisolone 1mg/kg for 6-10 weeks, then taper gradually.

Cyclophosphamide:

Indications:

- LN (classes III, IV & V); 24 hours urinary proteins > 1 g, low creatinine clearance
- CNS involvement

Dose:

- Give pulse therapy of 0.5 - 1 g/m^2 of body surface area as IVI in 500 mL fluid monthly for six cycles, then 3 monthly for next six cycles or the disease is inactive for 1 - 2 years. Then start HCQ or azathioprine.
- Alternately, give cyclophosphamide 250 mg/m^2 of body surface every 15 days for 12 doses, and then prednisolone as maintenance therapy.
- Oral cyclophosphamide can be given.

Side effects:

- Haemorrhagic cystitis, gonadal toxicity, amenorrhea, sterility, premature menopause, leukaemia. Contraindicated in pregnancy.
- Oral azathioprine (2 - 2.5 mg/kg day) may be given after 12 weeks of cyclophosphamide. Azathioprine has no adverse effect on pregnancy and no gonadal toxicity.

Periodic monitoring:

- Periodic blood count initially every other week, then monthly

Prevention of haemorrhagic cystitis:

- Acrolein, the metabolite of cyclophosphamide, is highly toxic to the urinary bladder mucosa, may cause hemorrhagic cystitis which can be prevented by:
  - Giving vigorous IV fluids (3 - 4 L)
  - Giving mesna (at 0, 4 and 8 hours)
  - Advising the patient to micturate frequently

▶ PROGNOSIS

- 90% 10-year survival rate (reduce survival if vital organs like CNS, heart, lungs and kidney involvement)
- At earlier age, usual cause of death is infection, renal or cerebral disease. At a later age, common cause is increased atherosclerosis resulting in myocardial infarction or stroke. Patients are therefore advised for cessation of smoking, control of hypertension, obesity, hyperlipidaemia, etc.

▶ ANTI-PHOSPHOLIPID SYNDROME (APLAS)

It is characterized by recurrent arterial or venous thrombosis, abortions or thrombocytopenia. It may either be without any primary cause like SLE (primary anti-phospholipid syndrome).

Types:

- ***Primary:*** thromboembolism without features of SLE
- ***Secondary:***
  - Rheumatological: RA, SLE, DLE, systemic sclerosis, dermatomyositis, Sjögren's syndrome, psoriatic, arthropathy
  - Vasculitis: Behcet's syndrome, temporal arteritis, Takayasu's arteritis

Catastrophic antiphospholipid syndrome, a severe type of APLAS, may occur in < 1% cases characterized by diffuse thrombosis/thrombotic microangiopathy and multiorgan failure. It is managed with IV heparin, high dose steroids and IVIG and plasmapheresis.

Types of anti-phospholipid antibody:

- ***Anti-cardiolipin antibody:*** IgG or IgM
- ***Lupus anticoagulant:*** Responsible for phospholipid dependent coagulation tests abnormality

Clinical features:

- Arterial or venous thrombosis
- Livedo reticularis
- Recurrent abortion or IUGR
- Thrombocytopenia and autoimmune hemolytic anemia
- TIA, stroke, chorea, epilepsy, migraine
- Libman-Sacks endocarditis

Investigations:

- Anti-phospholipid Ab (lupus anticoagulant and anti-cardiolipin)
- Indirect tests for anti-phospholipid antibody:
  - Prolonged PT & APTT not corrected by adding normal plasma.
  - Thrombocytopenia
  - False positive VDRL

Treatment

- ***With thrombosis:*** Lifelong warfarin
- ***Without thrombosis history (antiphospholipid Ab +ve only):*** aspirin or clopidogrel. Rarely, warfarin.
- ***In pregnancy:*** low dose aspirin and subcutaneous heparin

3. Systemic sclerosis

▶ HISTORY (CHIEF COMPLAINTS)

Details of thickening and tightness of skin

- *"Where exactly the thickening and tightening of skin is? .... Do you have thickening and tightening of skin anywhere else? **(site)*** (initially involvement of hands with difficulty in movements of finger and wrist joint; later changes affect face causing difficulty in opening of mouth)

- **Duration:** *"Since how long it has been present?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Associations (D/D):**
  - ***Systemic sclerosis:*** *"Do you have any joint pain or joint swelling? ...... Is there any swallowing difficulty? ...... Is there any breathing difficulty? ...... Is there any bowel abnormality?* (diarrhoea or constipation) ...... *Any change in colour of fingers on exposure to cold water or weather?"* (Raynaud phenomenon: fingers sequentially become pale, blue and red)
  - ***RA:*** *"Are your joint stiff when you woke up? ... Is it more than or less than 06 weeks duration?"* ***(morning stiffness)*** (not associated morning stiffness)
  - ***SLE:*** *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*

Details of Joint pains

- *"Which joints are painful?* **(small or large joints)** ...... *Are they swollen as well?* **(arthralgia or arthritis)** ...... *Do you have pain in any other joints as well?"* (knee, wrist and small hand joints, etc)
- *"Does it involve both the sides at the same time?"* **(Symmetrical or asymmetrical)**
- *Do you have pain in your back as well?"* (no involvement of back)

- **Duration:** *"Since how long you have the problem?"* (more than or less than 6 weeks)
- **Progression:** *"Is it worsening with time?*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, writing, using cutlery, social life and work, e.g. typing? ... Does it persist throughout the day and night? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse? ... activity or rest?"* (aggravated by activity)
- **Relieving factors:** *" What makes it better? ... activity or rest?"* (relieved by rest)
- **Associations (D/D):**
  - ***Symmetrical arthropathy:***
    - ***RA:*** *"Are your joint stiff when you woke up? ... Is it more than or less than 06 weeks duration?"* ***(morning stiffness)*** *(not associated morning stiffness)*
    - ***SLE & drug induced lupus*** *(Procainamide or hydralazine): "Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
    - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*
  - ***Asymmetrical:***
    - ***Seronegative spondyloarthropathies:*** *"Is pain and stiffness in your back associated with ...?"*
      - ***Ankylosing spondylitis***
      - ***Enteropathic arthropathy (IBD):*** *"Any loose bowel works?"*
      - ***Psoriatic arthropathy:*** *"Any scaly skin rash?"*
      - ***Reactive arthritis:*** *"Any stinging in your water or recent loose stools?"*
        Reiter's syndrome: *asymmetrical DIP joint arthropathy, uveitis, urethritis*
    - ***Gout:*** *"Do you have any acute attacks of joint swelling? ...... What triggers the attack? ... How often the attacks are?"*
    - **Rheumatic fever**

Details of difficulty in swallowing

"Can you please tell me what exactly the problem is?"

- *"Do you have painful swallowing or difficulty in swallowing?"* **(odynophagia vs dysphagia)**
- *"Do you have a difficulty in initiating swallowing with coughing, choking or nasal regurgitation?"* stroke, MND, MG, Globus hysterics **(Neurological disorder)**
- *"Do you feel sticking of food in your food pipe? ... Can you point to where food seems to stick?"* compression web, pharyngeal pouch, thyroid swelling **(High dysphagia)**
- *"Is it only for solids?"* **(obstructive)** Ask about **ALARM symptoms**: **A**naemia, **L**oss of weight, **A**norexia, **R**ecent onset of progressive symptoms, **M**alena/hematemesis, **S**wallowing difficulty)
- *"Or both for liquid and solids?"* **(motility disorder)**
  - *"Are you throwing food effortlessly?"* **Achalasia**
  - *"Is it intermittent with chest pain?"* **DES**
  - *"Do you have any skin changes or whitening of fingers on exposure to cold"* **Scleroderma**

- **Duration:** *"Since how long you have difficulty in swallowing?"*
- **Progression:** *"Is it getting worse?"*
- **Association (D/D):**
  - ***Esophagitis:***
    - Reflux oesophagitis
    - Drug-induced oesophagitis: NSAIDs, aspirin, potassium
    - Infective oesophagitis: candida, herpes, cytomegalovirus
  - ***Neuromuscular disorders:*** bulbar palsy
  - ***Benign esophageal stricture***
  - ***Esophageal tumor:*** carcinoma, benign such as leiomyoma
  - ***Motility disorder:*** achalasia, DES, scleroderma
  - ***Pharyngeal disorder:*** Pharyngeal pouch or web
  - ***Globus hystericus:*** High dysphagia in the throat related to anxiety
  - ***Foreign body obstruction:*** any history of a foreign body ingestion

Details of other complaints

- heartburn, loss of appetite and weight loss

▶ GENERAL EXAMINATION

As per findings

- **Hands:**
  - Skin is thick, smooth, shiny and tight with hyper- and hypo-pigmented areas (normal skin over chest and legs)
  - Sclerodactyly (tapering of fingers)
  - Digital ulcers and loss of soft tissue over fingertips (pulp atrophy), amputation of fingertips
  - Dilated and tortuous nail-fold capillaries
  - Palpable nodules of calcinosis
- **Face:**
  - Skin is smooth, shiny and tight; loss of wrinkling over forehead; hyper- and hypo-pigmented areas (salt & pepper appearance)
  - Perioral puckering with restrictive mouth opening (microstomia)
  - Nose appears pinched and tapered (bird beak appearance)
  - Telangiectasias

▶ SYSTEMIC EXAMINATION

Musculoskeletal System

- **Joints**
  - ***Swelling:*** swollen and tender IP and MCP joints of both hands; both wrist and knee joints
  - ***Deformity:*** flexion contracture of both hands

Examination of other systems

- No other abnormalities detected.

"My diagnosis is systemic sclerosis."

Differential Diagnoses

- Diabetic cheiroarthropathy
- Eosinophilic fasciitis or eosinophilic myalgia syndrome
- Scleromyxedema
- Chemically induced (pentazocine, bleomycin and vinyl chloride).
- Graft-versus-host disease (GVHD)
- Toxic oil syndrome
- **Scleredema:** In children, progressive self-limiting thickening and hardening of the skin usually on the scalp, face, neck upper back and upper part of the extremities with no involvements of the hands and feet; may have correlation with streptococcal infection; resolution occurs in 6 - 12 months.

DISCUSSION

▶ CLINICAL PRESENTATION

- Thickening and tightening of the skin over hands and other body parts
- Arthralgia/ non-erosive arthritis
- Raynaud's phenomenon
- Heartburns resulting from reflux esophagitis; dysphagia
- Diarrhoea, constipation (blind-loop syndrome)
- Breathlessness (DPLD)

Types:

Diffuse cutaneous systemic sclerosis (DCSS, 30%)

- Thickening & tightening of skin over trunk and extremities extending beyond knees and elbows
- Raynaud's phenomenon
- Renal involvement and DPLD are common (more often if topoisomerase-1 Ab +ve)

Limited cutaneous systemic sclerosis (LCSS, 70%)

- Thickening & tightening of skin limited to hands, feet, forearm and face
- Raynaud's phenomenon
- Pulmonary hypertension common
- CREST syndrome is a localized type of systemic sclerosis

Other varieties (localized):

- ***Scleroderma sine scleroderma:*** internal organ involvement but no skin lesion
- ***Plaque morphea:*** localized well demarcated and hardened plaques over skin of face and extremities with central hypopigmentation
- ***Linear morphea:*** Skin thickening is in a linear pattern over the extremities

Changes in the various other systems

Skin changes:

- Initially non-pitting edema followed by skin thickening and tightening with disappearance of skin creases over finger, hands, forearms, face, chest; loss of wrinkling over forehead
- Hypo- and hyper-pigmented areas (salt and pepper appearance)
- Perioral puckering with restrictive mouth opening (microstomia)
- Bird beak appearance of nose
- Telangiectasias

Raynaud's phenomenon:

- Causes critical tissue ischemia leading to digital ulcers, infarction and loss of pulp at fingertips.

Joints & muscles:

- Arthralgia, arthritis, flexor tenosynovitis, flexion contractures, proximal / distal muscle weakness and wasting

Gastrointestinal:

- ***Esophagus:*** involved in 50% cases causing dysphagia due to dysmotility, reflux esophagitis, odynophagia. Confirm by esophagial manometry showing ↓ or abnormal peristalsis in 90% of cases.
- ***Stomach:*** early satiety, recurrent occult upper GI bleed from antral vascular ectasia (watermelon stomach), gastric outlet obstruction.
- ***Intestine:*** diarrhoea, intestinal obstruction / pseudo-obstruction, blind-loop syndrome, wide-mouth colonic diverticula, ***pneumatosis cystoides intestinalis*** (presenting with severe abdominal pain; X-ray abdomen shows radiolucent cysts / streaks in small intestinal wall due to air.

Liver:

- PBC

Respiratory:

- DPLD
- Pulmonary hypertension (more common in limited scleroderma)

Heart:

- Conduction defect, cardiomyopathy, myocardial fibrosis

Kidneys (involved in 20% cases):

- Malignant hypertension
- Renal failure

Endocrine:

- Hypothyroidism (from fibrosis of thyroid gland)

Neurologic:

- Autonomic dysfunction
- Facial nerve palsy
- Entrapment neuropathy

CREST syndrome (limited cutaneous systemic sclerosis)

C: Calcinosis
R: Raynaud's phenomenon
E: Esophageal involvement (dysphagia)
S: Sclerodactyly
T: Telangiectasia

Investigations

- Anti-centromere Ab +ve in 70 - 80% of cases

Prognosis

- Prognosis better than diffuse systemic sclerosis

▶ INVESTIGATIONS

(Diagnosis is usually clinical)

- ↑**ESR** with normal CRP unless coexisting infection or severe organ involvement
- **Serology:**
  - RA factor +ve (20 - 30% of cases)
  - ANA +ve (70% of cases)
  - Anti-topoisomerase-1 or anti-Scl-70 +ve (30% of diffuse scleroderma cases)
  - Anti-centromere Ab +ve with a speckled nucleolar pattern (60% in CREST; 10% in diffuse systemic sclerosis)
- **Skin biopsy:** for histological diagnosis
- **Others:**
  - Hands X-ray: Ca^{+2} deposition around the fingers; erosion / resorption of phalanges and joint deformity
  - CXR and HRCT chest: DPLD and honeycomb appearance

  - Lung function tests: restrictive lung defect with ↓ diffusion capacity for CO.
  - Barium swallow: ↓peristalsis /dysmotility, distal narrowing of esophagus with proximal dilatation
  - Barium meal follow through
  - ECG

▶ MANAGEMENT

(no specific therapy)

- **Raynaud's phenomenon:**
  - ***Avoid cold exposure:*** use gloves or mittens; lubricants to avoid dryness
  - ***Antiplatelet:*** aspirin
  - ***Calcium antagonist (diltiazem and nifedipine), ACE inhibitors, ARBs (valsartan)***
  - ***Prostacyclin analogs:*** intermittent epoprostenol infusion (if non-responsive or in severe case)
  - ***Surgery:*** digital / lumbar sympathectomy, thoracic sympathectomy under VATS, microsurgical revascularization, amputation of fingers or toes
  - ***Antibiotic:*** Higher doses needed for infection on ulcerated skin lesions due to poor tissue penetration
  - ***Avoid:*** beta-blocker, ergotamine, oral contraceptive and sympathomimetic
- **Arthritis:** NSAIDs
- **Steroids / cytotoxic drugs:** if alveolitis or myositis
- **Drugs with no proven benefit:**
  - ***Penicillamine:*** ↓ collagen cross-linkages by anti-fibrotic action
  - ***Methotrexate:*** 7.5 to 15 mg weekly
  - ***Cyclosporin***
- **Other therapy:**
  - ***DPLD:*** cyclophosphamide / azathioprine + low dose steroids
  - ***Hypertension:*** ACE inhibitors
  - ***Pulmonary hypertension:***
    - Oral vasodilators:
      - *Prostacyclin (inhaled, SC or IV)*
      - *Endothelin receptor antagonist (bosentan, sitaxsentan)*
    - Warfarin
  - ***Right heart failure:*** diuretics, digoxin, single lung or heart lung transplantation
  - ***Reflux esophagitis:*** PPI and prokinetics
  - ***Blind-loop syndrome:*** broad spectrum antibiotics
  - ***Renal involvement:*** ACE inhibitor
  - ***Myositis:*** corticosteroid and cytotoxic drugs. There is little or no role of steroids in the treatment of scleroderma. If there is DPLD or myositis, prednisolone 10 mg daily with cyclophosphamide can be given.

▶ PROGNOSIS

Poor prognostic factors

- Diffuse cutaneous systemic sclerosis
- Internal organs involvement especially kidney, lung and heart
- Males
- Elderly

Limited cutaneous systemic sclerosis (CRST or CREST):

- Relatively better prognosis; 10-year survival is 70%
- Poor prognosis with pulmonary hypertension

Diffuse type:

- 5-year survival is 70%
- Death occurs due to cardiac, renal and pulmonary involvement

▶ MIXED CONNECTIVE TISSUE DISEASE (MCTD)

Mixed features of localized systemic sclerosis coexisting with RA, SLE and polymyositis.

Investigations:

- ***Anti-RNP:*** Positive in high titer

Clinical presentation:

- Raynaud's phenomenon, myalgia and swollen finger initially
- ***Systemic sclerosis features:*** calcinosis, sclerodactyly, telangiectasia develops later
- ***SLE, dermatomyositis, RA features:*** Skin rash of SLE or dermatomyositis, lung fibrosis, pulmonary hypertension, Sjogren's syndrome develops later.

Treatment:

- ***Steroids:*** Good response

Prognosis

- Good

4. Dermatomyositis

▶ HISTORY (CHIEF COMPLAINTS)

Details of generalized muscle pain and weakness

"Can you please tell me what exactly the problem is?"

- *Is it muscle pain only? ... Or muscle pain with weakness? ... Or weakness only without muscle pain? ...... Are the affected areas sore to touch? ...... Do you have bone pain as well?"* **(Description)**
- *"Which muscles are affected?"* **(Predominantly proximal muscle weakness with pain)** (difficulty in standing from sitting position and raising arms above head, like while combing hair)
- *"Do you have any rash? ... Where?"*
- *"Do you have any bone pains?"*

- **Duration:** *"Since how long you have weakness and muscles pain?"*
- **Onset:** *"How did it develop? ..... Suddenly or gradually?*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is?*
- **Aggravating or relieving factors:** *"What makes it better? ...... What makes it worse?*
- **Associations (D/D):**
  - ***Polymyositis/Dermatomyositis:***
    - **Proximal muscles weakness with pain:** Difficulty in walking upstairs or getting out of chair without using her arms; or raising arms above the head
    - **Rash**
  - ***Myopathy:*** Weakness without pain & stiffness in affected areas
  - ***Polymyalgia rheumatica/ Giant cell arteritis:***
    - **Pain and stiffness only without weakness:** in shoulders, neck, upper arms, buttocks, hips or thighs
    - Feeling of not being well (malaise), fever, weight loss
    - Visual problems, tenderness over temporal areas or jaw pain when eating
  - ***Fibromyalgia:*** *"Are the affected areas sore to touch?"* (No systemic features)
  - ***Osteomalacia:*** *Bone pains*
  - ***Myasthenia:*** *"Is the weakness more pronounced after repeated activity and improves after rest?" (Fatigability)*

Details of skin rash

- *"Where exactly the rash is? .... Do you have rash anywhere else?* **(site)**
- *How does it look like?"* **size, colour, shape (flat or raised), itchy** **(Description)** (non-itchy scaly red rash over face, hands, trunk and legs)

- **Duration:** *"Since how long it has been present?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Ever had it before:** *"Have you ever had the rash before?"*
- **Aggravating or relieving factors:** *"Does it aggravate on exposure to sunlight?"*

Details of Joint pains

- *"Which joints are painful? **(small or large joints)** ...... Are they swollen as well? **(arthralgia or arthritis)** ...... Do you have pain in any other joints as well?"* (arthralgia involving ankle, knee, wrist and small hand joints)
- *"Does it involve both the sides at the same time?"* **(Symmetrical or asymmetrical)** (symmetrical)
- *Do you have pain in your back as well?"* (no back involvement)

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, writing, using cutlery, social life and work, e.g. typing? ... Does it persist throughout the day and night? ... Does it affect your sleep?"*

- **Aggravating factors:** *"What makes it worse? ... activity or rest?"* (aggravated by activity)
- **Relieving factors:** *" What makes it better? ... activity or rest?"* (slightly relieved by rest)
- **Associations (D/D):**
    - ***Symmetrical arthropathy:***
        - ***RA:*** *"Are your joint stiff when you woke up?* ***(no morning stiffness)***
        - ***SLE & drug induced lupus*** *(Procainamide or hydralazine)****:*** *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
        - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*
    - **Asymmetrical:**
        - ***Seronegative spondyloarthropathies:*** *"Do you have pain or stiffness in your back?"* ***(no back pain)***
        - ***Gout:*** *"Do you have any acute attacks of joint swelling? ... What triggers the attack? ... How often the attacks are?"*
        - **Rheumatic fever**

▶ GENERAL EXAMINATION

As per findings

- **Heliotrope rash:** over both upper eyelids and periorbital edema
- **V-sign:** Erythematous V-shaped rash on the neck and upper chest
- **Shawl sign:** Erythematous rash around the neck and on the shoulders
- Erythematous, scaly, maculopapular rash over cheeks and forehead in a butterfly distribution
- Telangiectasia on face and hands

▶ SYSTEMIC EXAMINATION

Musculoskeletal System

Hands:

- Erythematous, scaly, maculopapular rash over the dorsum of the hands
- ***Gottron's sign:*** flat topped macular rash over the knuckles
- ***Telangiectasia:*** dilated nailfold capillaries
- Periungual erythema, ragged cuticles and haemorrhage

Joints:

- Tender & swollen joints with contracture deformities

Muscles:

- Upper / lower limbs proximal myopathy
- Muscle tenderness

Examination of other systems

- No other abnormalities detected

(DTR are usually intact)

"My diagnosis is dermatomyositis."

(Dermatomyositis skin rash usually involves knuckles with sparing of the phalanges. Rash in SLE involves the phalanges with sparing of knuckles)

Differential diagnoses

- SLE
- Systemic sclerosis
- MCTD
- Sarcoidosis
- Polymyalgia rheumatica (skin rash absent; association with temporal arteritis; normal CPK)

DISCUSSION

Polymyositis is a connective tissue disease of unknown cause, characterized by nonsuppurative inflammation and necrosis of skeletal muscles; when associated with skin rash, it is called dermatomyositis.

▶ INVESTIGATIONS

- **Muscle enzymes:**
  - CPK↑↑ (most sensitive test and an indicator of disease activity)
    Aldolase, SGPT, SGOT & LDH may be ↑
- **EMG**: (normal only in 10%)
  - Characteristic spontaneous fibrillation (at rest)
  - Short duration, small amplitude and polyphasic action potential (after voluntary activity)
  - Spontaneous bizarre, high potency salvos of repetitive discharge on mechanical stimulation of nerve
- **Muscle biopsy:**
  - Swelling, vacuolation, disruption / fragmentation and necrosis of skeletal muscles
  - Lymphocytes, macrophages, plasma cells and eosinophils infiltration
  - Fibrosis
  - Perivascular inflammatory cells infiltrate and vessel wall thickening
- **Antibodies:**
  - ***Anti-Jo-1 (anti-synthetase) Ab:*** +ve in 30% cases of dermatomyositis and 50% cases of polymyositis (presence of anti-Jo-1 Ab relates with involvement of respiratory muscles)
  - ***Anti-Mi2 Ab***
  - ***RA factor and ANA:*** +ve in 50% of cases
- **MRI of muscles:** for detection of abnormal muscles (helpful for taking muscle biopsy)
- **Other tests:**
  - ***For exclusion of malignancy:***
    - CXR, USG, CECT scan, mammogram, PET scan, GI imaging series for exclusion of bronchial carcinoma, carcinoma of the GIT, breast, and ovaries
- **Urine for myoglobin:** ARF may result from myoglobinuria secondary to rhabdomyolysis.

Causes of high CPK:

- Acute myocardial infarction (CK-MB)
- IM injection
- Exercise
- Muscle trauma
- Convulsions
- Myopathy
- Rhabdomyolysis
- Dermatomyositis or polymyositis
- Drugs: statins, narcotics, colchicine and chloroquine

CPK isoenzymes: CK-MM (skeletal muscle), CK-MB (cardiac muscle), CK-BB (in brain)

▶ ETIOLOGY

Actual etiology unknown

- **Autoimmune**
- **Viral infections:** coxsackie B, rubella and influenza
- **Malignancies:** Dermatomyositis is more commonly associated with malignancies than polymyositis (lungs, ovary, breast or stomach). Symptoms may precede actual malignancy. Most common such malignancy in males is bronchial carcinoma and in females is the ovarian carcinoma. Patients with dermatomyositis or polymyositis without any associated antibodies should always be screened for malignancies.
- **Drugs known to cause polymyositis:** penicillamine and zidovudine

CLINICAL PRESENTATIONS

F:M = 2:1, peak incidence 5th – 6th decades.

- **Proximal myopathy:** mainly proximal muscles weakness involving shoulder and pelvic girdle.
- **Skin rash:**
    - ***Heliotrope rash:*** It is a lilac, violaceous or purple coloured photosensitive scaly rash over the upper eyelids and, sometimes over the nasal bridge and the cheeks. It is pathognomonic of dermatomyositis. The name *'heliotrope'* has been derived from the name of shrub Heliotropium having purple flowers.
    - ***Gottron's sign:*** Raised flat-topped, purple-red scaly rash over the knuckles of the hands and extensor surface of joints including the elbow and knee.
    - ***V-sign:*** Erythematous V-shaped rash on the neck and upper chest
    - ***Shawl sign:*** Erythematous rash around the neck and on the shoulders
    - ***Dermatomyositis sine myositis:*** if only skin rash is present without involvement of muscles
- **Weakness of pharyngeal, laryngeal and respiratory muscles:** it may cause dysphagia, dysphonia and respiratory failure.
- Myalgia, arthralgia/ arthritis and Raynaud's phenomenon.

MANAGEMENT

- **Steroids:**
    - ***Prednisolone:*** Give 0.5 - 1 mg/kg daily until 1 month after myositis is clinically settled with normal muscle enzymes followed by gradual tapering; maintenance dose 5 - 7.5 mg daily may need to be continued for months to years.
    - ***Methylprednisolone:*** Give 1 g daily for 3 days if severe respiratory or pharyngeal weakness
- **Methotrexate or azathioprine:** If no response to steroids
- **Cyclosporine or cyclophosphamide or mycophenolate mofetil:** If no response to methotrexate and azathioprine
- **High-dose IV immunoglobulin**
- **Management of underlying malignancy**
- **Physiotherapy**

PROGNOSIS

Dermatomyositis responds to treatment better than polymyositis but if underlying malignancy the prognosis is poor.

- **Prognosis with treatment:** 5 years survival rate >95%, 10 years survival rate 84%
- **Poor prognostic features:** severe dysphagia or respiratory difficulty, elderly, malignancy

EATON-LAMBERT SYNDROME

Paraneoplastic syndrome

Causes:

- Small cell carcinoma of the lung (triggering of autoantibody against prejunctional voltage gated calcium channel resulting in defective acetylcholine release at NMJ)

Clinical features:

(may either precede the manifestations of carcinoma or develop simultaneously)

- ***Proximal muscle weakness and wasting:*** Lower limbs are commonly affected but may involve any muscle)
- ***Ptosis & diplopia:*** in 70% of cases
- ***DTR:*** ↓ or absent DTR which normalize on sustained contraction or repeated activity
- ***Power:*** muscle power may improve after sustained contraction or repeated activity (reverse of myasthenia gravis)
- ***Autonomic dysfunction:*** impotence, constipation, dry mouth

  (DTR abnormality and autonomic disturbance are NOT present in myasthenia gravis)

Investigations:

- ***EMG:*** Progressive incremental response on repeated contraction (MG have a decremental response)
- ***P/Q-type voltage-gated Ca^{+2} channel antibodies (anti-VGCC):*** +ve in 90% of cases

Treatment:

- 3, 4 diaminopyridine (DAP)
- IV immunoglobulin
- Plasmapheresis
- Pyridostigmine for symptomatic relief
- Treat primary cause

▶ CAUSES OF PROXIMAL MYOPATHY

- Thyrotoxicosis
- Cushing's syndrome
- Osteomalacia
- Diabetic amyotrophy
- Drugs:
  - Drugs not associated with high CPK: steroids
  - Drugs associated with high CPK: Statins, chloroquine, colchicine
- Myopathies: facioscapulohumeral (except myotonic dystrophy), limb girdle
- Polymyositis or dermatomyositis
- Myasthenia gravis
- Eaton-Lambert syndrome

▶ CAUSES OF PAINFUL MUSCLE

- Viral infections
- Fibromyalgia
- Polymyalgia rheumatica
- Post-exercise, post-convulsion
- Chronic alcoholism
- Polymyositis
- Rheumatological diseases

▶ CAUSES OF SUDDEN MUSCULAR WEAKNESS

- GB syndrome
- Hypokalaemia and hyperkalaemia
- Familial periodic paralysis
- Thyrotoxic periodic paralysis

5. Ankylosing spondylitis

▶ HISTORY (CHIEF COMPLAINTS)

Details of low back pain and stiffness

- **Site of pain:** *"Where exactly the pain and stiffness are? ... Can you point it?* (low back pain) ...... *Do you have pain in any other joints?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull? ...... Is it a constant pain or it comes and goes?"*
- **Radiation:** *"Does it move to the front or legs?"*
- **Associations:**
  - **Ankylosing spondylitis:** *"Any pain or redness in the eyes?"*
  - ***IBD:*** *"Any loose bowel works? ...... Any sours in the mouth?"*
  - ***Psoriatic arthritis:*** *"Any scaly skin rash? ...... Any nail changes?"*
- **Timings/duration:** *"Since how long you have the pain?"*
- **Exacerbating & relieving factors:** *"What makes it worse? ...... What makes you feel better?"* worse after inactivity or waking from sleep in the mornings; improves with exercise or physical activity. *Is it relieved with pain control medicines?"*
- ***Severity:*** *"How bad it is on a scale of 1-10? ...... How badly it is affecting your life including work and sleep? ...... Any difficulty in bending to either sides, forward or backward due to pain?"*

Details of pain in other joints (neck, hip and knee joint)

  - *"Which other joints are painful? ...... Are they swollen as well?* ***(arthralgia or arthritis)*** *...... Do you have pain in any other joints as well?"* (neck and hip usually)
  - *"Does it involve both the sides at the same time?"* **(asymmetrical)**
- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, social life and work? ... Does it persist throughout the day and night? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse? ... activity or rest?"* (aggravated by rest)
- **Relieving factors:** *" What makes it better? ... activity or rest?"* (relieved by activity)
- **Associations (D/D):**
  - **Asymmetrical:**
    - ***Seronegative spondyloarthropathies:*** *"Is pain and stiffness in your back associated with ...?"*
      - ***Ankylosing spondylitis:*** *"Any pain or redness in the eyes?"*
      - ***Enteropathic arthropathy (IBD):*** *"Any loose bowel works? ...... Any sours in the mouth?"*
      - ***Psoriatic arthropathy:*** *"Any scaly skin rash? ...... Any nail changes?"*
      - ***Reactive arthritis:*** *"Any stinging in your water or recent loose stools?"*
        Reiter's syndrome: *asymmetrical DIP joint arthropathy, uveitis, urethritis*
  - ***Symmetrical arthropathy:***
    - ***RA:*** *"Are your joint stiff when you woke up?* ***(morning stiffness)***
    - ***SLE & drug induced lupus*** *(Procainamide or hydralazine)*: *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
    - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*

▶ GENERAL EXAMINATION

As per findings

- **Eyes:** slightly red
- **Skin or nail changes** (for exclusion of psoriatic arthritis): none

▶ SYSTEMIC EXAMINATION

Locomotor System

Spine:

- Loss of thoracic kyphosis / lumbar lordosis and compensatory neck hyperextension (question mark '?' or stooped posture)
- **Thoracic and lumbar spine:**
  - ***Movements:*** restricted in all directions (flexion, extension, lateral movements, rotation at thoracic spine). Unable to turn to any direction without moving the whole body.
  - ***Modified Schober's test:*** positive
- **Cervical spine:**
  - Movements restricted in all directions
  - Unable to touch the occiput to the wall while standing with the back and heel touched against the wall. Gap between wall and occiput indicates limitation of movement at cervical and thoracic spine. **(Occiput to wall distance)**
- **SI joint:**
  - ***Compression test for pain provocation:*** compress anterior superior iliac spine with the palm of both hands together from behind the patient while the patient is lying on normal side to check for sacroiliitis.

Large joints:

- Swollen and tender large joints (knee joint) with restricted movements

Other findings:

- **Achilles tendinitis:** Achilles tendon sore to touch
- **Plantar fasciitis:** Pain on palpation of the plantar medial aspect of the heel and passive dorsiflexion of the ankle and toes

Respiratory System

- ***Chest expansion:*** reduced due to restricted movement at costovertebral joints
- ***Auscultation:*** crepitations over both apices (apical fibrosis)

Cardiovascular System

- ***Second heart sound:*** aortic component soft
- ***Murmur:*** early diastolic murmur at left lower parasternal edge (AR)

Examination of other systems

- No other abnormalities detected.

"My diagnosis is ankylosing spondylitis."

Differential diagnoses

- Reactive arthritis or Reiter's syndrome
- Enteropathic arthropathy (Crohn's disease, ulcerative colitis)
- Psoriatic arthritis
- Juvenile chronic arthritis (< 16 years old)

Radiological differential diagnosis

- **Alkaptonuria:** In alkaptonuria, calcification of intervertebral disk occurs which is absent in AS.
- **Diffuse idiopathic skeletal hyperostosis (DISH)**: characterized by new bone formation along the anterolateral aspects of minimum of 04 contiguous vertebral bodies, resembling the flowing wax on the anterior aspect of vertebra. Apophyseal and sacroiliac joints are normal in DISH. The condition is usually asymptomatic.
- **Lumbar spondylosis**: marginal sclerosis with disk space narrowing
- **Osteitis condensans ilii**: Benign sclerosis of the ilium adjacent to the SI joint, typically bilateral and triangular in shape. Most often seen in women after childbirth.

DISCUSSION

Ankylosing spondylitis is a chronic inflammatory seronegative arthritis.

CLINICAL FEATURES

Common in 2nd and 3rd decade, M: F = 3:1

Articular manifestations

- ***Axial skeletal features:*** Lower backache associated with morning stiffness, worse after inactivity and on waking in the morning; improves on activity and exercise.
- ***Peripheral arthritis:*** 10% cases
- ***Enthesitis:*** Plantar fasciitis and Achilles' tendinitis

  Enthesopathy is the inflammation at the ligamentous insertion with adjacent bone erosion. New bone is formed, called syndesmophyte (hallmark of ankylosing spondylitis), once these lesions heal at the junction of intervertebral disks and vertebral bodies.

Extra-articular manifestations

- ***Eyes:*** recurrent painful red eyes with photophobia due to anterior uveitis (iritis) 25%, conjunctivitis 20%
- ***Heart:***

  AR: in ankylosing spondylitis AR is due to aortic root dilatation caused by aortitis while in rheumatic heart disease it is due to valve cusps involvement
  - MR
  - Conduction defect (first-degree block, LBBB, AV block)
  - Pericarditis
- ***Lungs / chest:***
  - ***Chest pain:*** Due to pleuritis or involvement of costochondral joint
  - ***Reduced chest expansion:*** due to involvement of costovertebral joint
  - ***Apical lung fibrosis***
  - ***Pulmonary hypertension and cor pulmonale***
- ***Neurological:*** Cauda equina syndrome (saddle anaesthesia, lower limbs weakness, loss of sphincter control)
- ***Amyloidosis***
- ***Prostatitis (80%)***

DIAGNOSTIC CRITERIA

Chronic back pain in adults <50 years old with 3 out 4 following criteria indicates AS:

- Morning stiffness lasting > 30 minutes
- Backache improving with exercise; aggravating after inactivity
- Night-time awakening during after mid-night due to backache
- Alternating buttock pain

OR

Modified New York Criteria (1984)

Definite AS: one clinical + one radiological criteria

Clinical criteria

- Low back pain ≥ 3 months, improved by exercise and not relieved by rest
- Limitation of lumbar spine movement in sagittal and frontal planes
- Limitation of chest expansion (relative to normal)

Radiological criteria

- Bilateral sacroiliitis grade 2-4
- Unilateral sacroiliitis grade 3-4

Radiographic sacroiliac (SI) joint changes are graded as follows:

- Grade 0 – Normal
- Grade 1 – Suspicious
- Grade 2 – Minimal sacroiliitis
- Grade 3 – Moderate sacroiliitis
- Grade 4 – Ankylosis

Assessment of lumbar spine flexion (Schober's test)

- Mark the vertebral column 5 cm below and 10 cm above the line joining the 'Dimple of Venus' passing along the posterior superior iliac spines and L5 spinous process. Now ask to bend forward as far as possible and measure the distance between lower and upper markings. In patients having <50 years of age, the normal increment by bending forward is > 5 cm. Increment of <5 cm indicates limitation of lumbar spine mobility.
- **Modified Schober's test:** As the lower part of the marking remains fixed, therefore only the upper marking (10 cm above) can be used for the test that suffice.

▶ SPONDYLOARTHROPATHIES

Group of inflammatory arthritis characterized by:

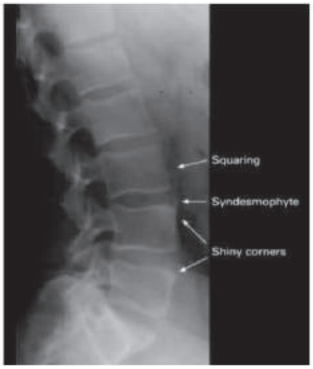
- Negative RA factor (seronegative)
- Sacroiliitis and inflammatory spondylitis
- Asymmetrical inflammatory oligoarthritis of large joints
- Inflammatory enthesitis
- Absent rheumatoid nodules and other extra-articular features of RA

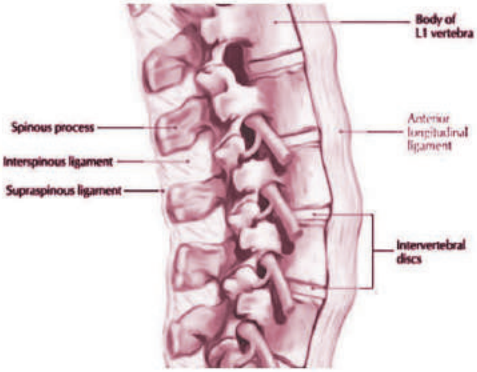
Diseases

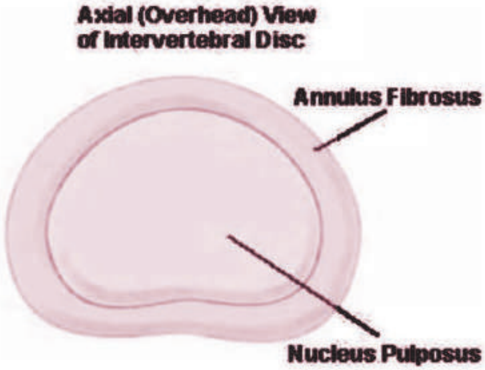
- Ankylosing spondylitis
- Reactive arthritis or Reiter's syndrome
- Enteropathic arthritis (Crohn's disease and ulcerative colitis)
- Psoriatic arthritis

▶ INVESTIGATIONS

- **X-ray spine:** (lumbosacral, dorsal and cervical)
  - ***SI joints:*** Sacroiliitis begin in the lower synovial parts of SI joints with
    - Irregularity
    - Loss of cortical margins
    - Widening of the joint space
    - Sclerosis, narrowing and fusion lastly
  - ***Thoracolumbar spine:***
    - **Squaring, or straightening of vertebra:** erosion of anterior concave border of vertebral body causes squaring
    - **Bamboo spine appearance:** the outermost fibres of annulus forms bridging syndesmophyte with bamboo spine appearance
    - Ossification of interspinous and anterior longitudinal ligaments and facet joint fusion.


Squaring
Syndesmophyte
Shiny corners


Body of L1 vertebra
Spinous process
Interspinous ligament
Supraspinous ligament
Anterior longitudinal ligament
Intervertebral discs


Axial (Overhead) View of Intervertebral Disc
Annulus Fibrosus
Nucleus Pulposus

- **MRI LS spine:** more sensitive than X-ray
- **Inflammatory markers:** ↑↑ CRP & ESR
- **RA factor:** -ve
- **Lymphocytes HLA-B27**: +ve in 90% of cases. Its presence increases the probability of AS, but it is neither necessary nor sufficient for diagnosis. If HLA-B27 is absent, there is probability of IBD.
- **Genetic counselling:** Offer genetic counselling as there is 30% chance of AS in the siblings if HLA-B27 positive.
- **Barium enema and follow through:** to rule out IBD

TREATMENT

- **Exercise**: Patient is advised to remain active and avoid prolong sitting or inactivity. Swimming is the best activity.
- **NSAIDs:** for pain relief
- **Physiotherapy**
- **DMARDs**: Sulfasalazine or methotrexate helpful in peripheral arthritis, but not effective in axial disease
- **Anti-TNF drugs:** It is helpful in persistent active inflammation for both spinal and peripheral disease
- **Local steroid injection:** Given for peripheral arthritis, enthesopathies and persistent plantar fasciitis
- **Oral steroids**: used for acute uveitis
- **Orthopaedic measures:** may be required for severe restriction at shoulder, hip or knee joint

PROGNOSIS

Prognosis is excellent with minimum disability, if treatment is appropriate and hip joints are not involved. Early hip joint involvement indicates poor prognosis. Approximately 80% patients remain fully employed.
Severe spinal restriction may develop in 40% while there would be significant disability in 20% cases.
Usually the causes of death are amyloidosis and spinal fracture particularly of cervical spine resulting in tetraplegia.

SYNDESMOPHYTE VERSUS OSTEOPHYTE

Syndesmophyte	Osteophyte
Found in ankylosing spondylitis	Found in osteoarthrosis
Inflammatory onset	Degenerative onset
Results from calcification of the annulus fibrosus	Results from new bone formation at vertebral corners
extends vertically above or below with bridging of adjacent vertebra	extends horizontally outwards

MECHANICAL VERSUS INFLAMMATORY ARTHRITIS

Features	Mechanical arthritis	Inflammatory arthritis
Age	Any age	< 40 years
Family history	No	Usually positive
Exercise	Worsening	Improvement
Rest	Improvement	Worsening
Morning stiffness	No	Positive
Sleep disturbance	No	Yes

6. Psoriatic arthropathy

▶ HISTORY (CHIEF COMPLAINTS)

Details of Joint pains

- *"Which joints are painful?* **(small or large joints)** ...... *Are they swollen as well?* **(arthralgia or arthritis)** ...... *Do you have pain in any other joints as well?"* (arthralgia involving ankle, knee, wrist and small hand joints)
- *"Does it involve both the sides at the same time?"* **(Symmetrical or asymmetrical)**
- *Do you have pain in your back as well?"* **(back involvement)**

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad is the joint pain on a scale of 1-10? ... Does it affect your daily chores of life like dressing, writing, using cutlery, social life and work, e.g. typing? ... Does it persist throughout the day and night? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse? ... activity or rest?"* (aggravated by rest)
- **Relieving factors:** *"What makes it better? ... activity or rest?"* (relieved by activity)
- **Associations (D/D):**
    - ***Symmetrical arthropathy:***
        - ***Psoriatic arthropathy (RA pattern):*** *"Any scaly skin rash?"*
        - ***RA:*** *"Are your joint stiff when you woke up?"*
        - ***SLE & drug induced lupus*** *(Procainamide or hydralazine)*: *"Any skin rash over sun exposed areas, sores in mouth (painless mouth ulcer), loss of scalp hair, spontaneous abortion, blood clots in blood channels of legs (DVT)?"*
    - **Asymmetrical:**
        - ***Seronegative spondyloarthropathies:*** *"Is pain and stiffness in your back associated with ...?"*
            - ***Psoriatic arthropathy:*** *"Any scaly skin rash?"*
            - ***Ankylosing spondylitis:*** *"Any pain or redness in the eyes?"*
            - ***Enteropathic arthropathy (IBD):*** *"Any loose bowel works?"*
            - ***Reactive arthritis:*** *"Any stinging in your water or recent loose stools?"*
              Reiter's syndrome: *asymmetrical DIP joint arthropathy, uveitis, urethritis*
        - ***Gout:*** *"Do you have any acute attacks of joint swelling? ... What triggers the attack? ... How often the attacks are?"*
        - **Rheumatic fever**

Details of skin rash

- *"Where exactly the rash is? .... Do you have rash anywhere else?* **(site)**
- *How does it look like?"* **size, colour, shape (flat or raised), itchy (Description)** (erythematous red, raised and thick scaly plaques of skin over the extensor surfaces, scalp, navel, behind the ears)

- **Duration:** *"Since how long it has been present?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Ever had it before:** *"Have you ever had the rash before?"*
- **Aggravating factors:** *"What makes it worse? ...... Does it aggravate on exposure to sunlight?"*
- **Relieving factors:** *"What makes it better?"*

▶ GENERAL EXAMINATION

As per findings

- **Skin**: Erythematous red, raised and thick scaly plaques of skin over the extensor surfaces, scalp, navel and behind the ears
- **Nails**: Pitting, onycholysis (separation of the nail plate from the nail bed), transverse ridging

▶ SYSTEMIC EXAMINATION

Locomotor System

Spine:

- **SI joint:**
    - ***Compression test for pain provocation:*** compress anterior superior iliac spine with the palm of both hands together from behind the patient while the patient is lying on normal side to check for sacroiliitis. **(Positive)**

Joints:

- **Large joints:** Swollen and tender large joints with restricted movements
- **Dactylitis:** 'Sausage-like swelling of the fingers and toes due to inflammation of the tendon sheath and soft tissues

Other findings:

- **Achilles tendinitis:** Achilles tendon sore to touch

Respiratory System

- ***Auscultation:*** crepitations over both apices (apical fibrosis)

Examination of other systems

- No other abnormalities detected.

"My diagnosis is psoriatic arthritis."

Differential diagnoses

- Psoriatic arthritis
- Reactive arthritis or Reiter's syndrome
- Enteropathic arthropathy (Crohn's disease, ulcerative colitis)
- Juvenile chronic arthritis (< 16 years old)

DISCUSSION

▶ CLINICAL FEATURES

- HLA-B27 (60-70% of psoriatic arthritis patients having spondylitis) and HLA-B7 antigens is associated with psoriatic spondylitis.

Skin changes

- Erythematous scaly plaques over the extensor surfaces, scalp, navel and behind the ears.
- **Inverse psoriasis:** If psoriasis appears on flexor surfaces and intertriginous areas (axillae, inguinal folds, infra-mammary creases) with minimal scaling; it is termed as 'inverse psoriasis'.
- **Koebner phenomenon**: appearance of new plaques of psoriasis on the site of cutaneous injury

Nail dystrophy (80% cases)

- Nail pitting, onycholysis (separation of the nail plate from the nail bed), transverse ridging and subungual hyperkeratosis
- Nail dystrophy is strong predictor of development of development of psoriatic arthritis later.

Musculoskeletal:

- Psoriasis may cause hyperuricaemia and gout

Cardiovascular:

- Aortitis and aortic regurgitation

Respiratory:

- Apical lung fibrosis

Eyes:

- Conjunctivitis, uveitis

Psoriatic arthropathy (5-8% of cases)

- **Patterns of arthritis**

  Nail changes are strong predictor of arthritis. Even patients with minimal skin involvement may develop psoriatic arthropathy. Arthritis may precede up to 20 years the onset of psoriasis in 20% cases. Psoriatic arthropathy can be distinguished from the other spondyloarthropathies by the presence of peripheral arthritis, the asymmetry of spinal involvement, and lesser degree of pain.
  - ***Rheumatoid pattern*** (60-80% cases of psoriatic arthritis)
    - Symmetrical polyarthritis involving PIP, MCP joints (sparing of DIP joints), wrists, feet, and ankles (clinically indistinguishable from RA but subcutaneous nodules are absent with mild asymmetry)
    - RA factor and anti-CCP antibodies typically absent
  - ***Asymmetrical oligoarthritis*** (25% cases of psoriatic arthritis)
    - Initially involves DIP joints progressing to a polyarticular arthritis affecting hands and feet
    - Inflammation of tendon sheath and soft tissue in fingers and toes causing 'sausage' appearance (dactylitis)
  - ***DIP arthritis*** (5-10% cases of psoriatic arthritis)
    - Classical presentation of psoriatic arthropathy
    - Nail dystrophy with distal IP joint arthritis
  - ***Arthritis mutilans*** (1-5% cases of psoriatic arthritis)
    - Aggressive deforming arthritis causing bone resorption with joint dissolution leading to telescoping' of digits within redundant overlying skin
  - ***Spondylitis / sacroiliitis*** (20-40% cases of psoriatic arthritis)
    - Spondylitis ± sacroiliitis
    - Vertebral involvement is asymmetrical (symmetrical in ankylosing spondylitis)
- ***Enthesitis***
  - Enthesopathy is specific for spondyloarthropathy characterized by the inflammation at the insertion site of ligaments, tendons, joint capsule, or fascia to bone; the most common sites of inflammation are the insertion of the Achilles tendon (Achilles tendonitis) and the insertion of the plantar fascia ligament to the calcaneus (plantar fasciitis).

▶ MANAGEMENT

- **General measures**
  - Patient education
  - Physiotherapy
  - Occupational therapy
- **Pharmacological treatment**
  - Analgesics
  - NSAIDs (in some patients NSAIDs may worsen psoriasis)
  - ***Corticosteroids:*** Intra-articular steroid injections for single troublesome joints. Avoid systemic steroids, since skin disease may flare on steroid withdrawal.
  - ***DMARDs***
    - Methotrexate, sulphasalazine and cyclosporin (effective for skin symptoms and peripheral arthritis, but not for axial symptoms)
  - ***Biological therapy***
    - Etanercept, infliximab, and adalimumab improve skin disease and joint disease

      Adverse effects
      - Serious infections (e.g. tuberculosis)
      - Haematological malignancy
      - Hypersensitivity
      - Worsening heart failure
      - Haematological abnormalities (anaemia, leukopenia, thrombocytopenia, aplastic anaemia

      Contra-indications
      - Pregnancy and breast-feeding

  - Active bacterial infection
  - Active TB (requires 2 months of anti-tuberculous therapy before anti-TNF α therapy
- ***Antimalarials***—Chloroquine and hydroxychloroquine were previously avoided due to concerns about worsening psoriasis and precipitating exfoliative dermatitis. Recent case-controlled studies have not confirmed this association, although these agents are still rarely used.

RA VERSUS PSORIATIC ARTHRITIS

	Rheumatoid arthritis	Psoriatic arthropathy
Clinical features	• Sparing of DIP joints • Symmetrical • No enthesopathy	• DIP joints commonly involved • Asymmetrical • Enthesitis, spinal involvement and dactylitis
Radiology	• Periarticular swelling, joint erosions, juxta articular osteoporosis, and uniform joint space narrowing	• Early deformity, with bone lysis and telescoping of digits, causing the "pencil in cup' appearance
Serology	• RA factor in 70% • Anti-CCP Ab in 60%	• RA factor in 10% • Anti-CCP Ab in 15%
Extra-articular manifestations	• Rheumatoid nodules in seropositive disease	• Rheumatoid nodules absent
Genetics	• Weak association with HLA-DR4 and TNF- α polymorphisms	• Strong association of psoriatic spondylitis with HLA-B27

IV. ENDOCRINOLOGY

1. Hypothyroidism

▶ HISTORY (CHIEF COMPLAINTS)

Details of weight gain and generalised body swelling

  - *"Where exactly you are putting weight in your body?'* **(Distribution of fat)**
- **Duration:** *"Since how long your weight is increasing?"*
- **Progression:** *"Is it worsening with time? ... Is there any change in your appetite?"*
- **Severity:** *"How much weight you have gained? ... What was your previous weight?"*
- **Associations (D/D):**
  - ***Glands***
    - *"Do you have any intolerance to cold or preference to warm environment; constipation; any change in voice or hoarseness; dryness and roughening of skin; tingling, numbness of hands or feet; thyroid surgery, radiation to the neck; any difficult delivery during the last 6 months; any excessive menstrual bleeding?"* ***(Hypothyroidism)***
    - *"Do you have any skin changes like thinning, striae or bruising; hair growth/acne; difficulty in climbing stairs or standing up from a sitting position; irregular or missed menstrual periods, poor libido; hypertension, worsening diabetes; bony fractures?"* ***(Cushing's)***
    - *"Any progressive enlargement of body parts with increase in ring or hat size?"* ***(Acromegaly)***
  - ***Excessive diet, lack of exercise***

▶ GENERAL EXAMINATION

As per findings

- **Face:** Pale looking; course facial features; facial puffiness, baggy eye lids, periorbital swelling; loss of eyebrows in the outer one-third
- **Skin:** Dry, rough, cold, thick skin; yellowish tinge (due to carotenemia); vitiligo; erythema ab igne
- **Legs:** Swelling over the whole body; non-pitting edema (due to deposition of mucopolysaccharides)
- **Thyroid:** not enlarged (mention if thyroid enlarged)
- **Pulse:** bradycardia with rate of 50/min, regular, high volume, normal in character

▶ SYSTEMIC EXAMINATION

CNS

- **Higher mental functions**
  - ***Speech:*** croaky (husky & coarse) voice
  - ***Memory:*** ± slight impairment
- **Motor functions**
  - ***DTR:*** slow relaxation of DTR (*'hung-up reflex'*), best elicited in ankles while kneeling on bedside / chair.
  - ***Carpal tunnel syndrome***

Examination of other systems

- No other abnormalities detected.

"My diagnosis is hypothyroidism (myxoedema)."

Differential diagnoses

- **Nephrotic syndrome** (initially swelling is over face, which then becomes generalized with pitting edema, scanty micturition)
- **Cushing's syndrome** (centripetal obesity with relatively thin extremities; puffy, plethoric, moon-like face; buffalo hump, supraclavicular fat pad; purple striae)

DISCUSSION

▶ CAUSES

Autoimmune:

- Graves' disease (TSH receptor blocking Ab)
- Hashimoto's thyroiditis
- Spontaneous atrophic hypothyroidism

Iatrogenic:

- Post-thyroidectomy
- Post-radioiodine therapy
- Post-radiotherapy of neck
- Drugs: antithyroid drugs, amiodarone, lithium

Others:

- Postpartum thyroiditis
- Endemic iodine deficiency
- Secondary to hypopituitarism and hypothalamic disorders
- Dyshormonogenesis

Causes of goitrous hypothyroidism

- Graves' disease: exophthalmos, dermopathy and diffuse goitre (course of Graves' disease is hyperthyroidism → euthyroidism → hypothyroidism)
- Hashimoto's thyroiditis
- Endemic iodine deficiency goitre (less common)
- Drugs: amiodarone, lithium, iodide
- Dyshormonogenesis (in neonates)

Cause of nongoitrous hypothyroidism

- Spontaneous atrophic or autoimmune or idiopathic (commonest cause)
- Post-thyroidectomy
- Post radioiodine therapy
- Post radiotherapy in the neck
- Secondary to hypopituitarism, hypothalamic disorders

Secondary hypothyroidism

Causes

- Pituitary or hypothalamus

Investigations

- ↓FT3, ↓FT4 and ↓TSH
- TRH stimulation test: Give TRH; if TSH↑, the cause of hypothyroidism is in hypothalamus; If no or little ↑ TSH, the cause of hypothyroidism is in the pituitary.

Difference between primary and secondary hypothyroidism

- ***Primary hypothyroidism:*** results from hypofunction of thyroid gland itself. Myxedema is usually present in primary hypothyroidism.
- ***Secondary hypothyroidism:*** results from pituitary / hypothalamic disorders. Myxedema is uncommon and other manifestations of hypopituitarism are also present.

▶ CLINICAL FEATURES

Skin

- *Dry, rough, cold, thick skin; yellowish tinge (due to carotenemia)*
- Vitiligo; erythema ab igne
- ***Myxedema:*** It is the deposition of mucopolysaccharides in the dermis causing swelling of the affected area. Myxedema is always associated with hypothyroidism except (rarely also in hyperthyroidism), but not all the cases of hypothyroidism have myxedema. Usually, myxedema is also not present in secondary hypothyroidism.

Cardiovascular:

- Sinus bradycardia
- Atherosclerosis, IHD, CCF & hypertension
- Pericardial effusion

Neurological:

- ***Speech:*** coarse husky (croaky) voice
- ***DTR:*** slow relaxation of DTR (*'hung-up reflex'*), best elicited in ankles while kneeling on bedside / chair.
- ***Cerebellar syndrome***
- ***Myxedema madness/coma:*** Severe hypothyroidism may result in depression, dementia, psychosis or delusion. These symptoms may also appear soon after commencing thyroxine.
- ***Fits:*** due to SIADH
- ***Proximal myopathy***
- ***Neuropathies:*** Entrapment neuropathy (carpal tunnel syndrome or tarsal tunnel syndrome), peripheral neuropathy
- ***Hoffman's syndrome:*** Post-exercise myotonia, pain and swelling in the muscles.
- ***Pendred's syndrome:*** Autosomal recessive disorder with sensorineural deafness and goiter resulting from inborn error in the synthesis of thyroid hormone.

▶ INVESTIGATIONS

- **↓FT3, FT4 and ↑TSH:** TSH is the single investigation which can diagnose hypothyroidism.
- **Autoantibody**
  - Hashimoto's thyroiditis: anti thyroperoxidase (anti TPO) and antithyroglobulin antibody
  - Hypothyroidism due to Graves' disease: TSH receptor antibody
- **Other routine tests:**
  - ***CBC:*** anaemia
    - Usually normocytic normochromic (anaemia of chronic disease)
    - Iron deficiency anaemia (in females with menorrhagia)
    - Macrocytic anaemia (resulting from pernicious anaemia due to deficiency of vitamin B_{12})

    Hypothyroidism without pernicious anemia causes non-megaloblastic macrocytosis characterized by macrocytosis on peripheral blood smear with normoblastic bone marrow.
  - ***USG neck***
  - ***ECG:*** low voltage QRS complexes, sinus bradycardia
  - ***Lipid profile:*** ↑ total cholesterol, LDL and triglycerides
  - ***CXR:*** ↑CTR due to dilated cardiomyopathy or pericardial effusion
  - ***CPK, LDH, SGOT*** (may be ↑ but not done in routine)

▶ TREATMENT

- **Thyroxine:** Start with a low single daily dose before breakfast (high dose may precipitate anginal attack) and increase gradually after 3 weeks. Repeat TSH after 6-8 weeks. Continue maintenance therapy with single daily dose for life long once TSH is normalized and repeat thyroid function test annually.

  If there is no response to treatment, check:
  - Insufficient dose or noncompliance
  - Hypopituitarism or Addison's disease

  Remember with concomitant cortisol deficiency (hypopituitarism or Addison's disease), give corticosteroid first and then thyroxine, otherwise severe Addisonian crisis may result.

  In IHD: Start thyroxine in low dose (25 μg) and increase gradually up to the optimum dose. Add:
  - β -blockers (propranolol)
  - Coronary vasodilators, calcium channel blocker

  In elderly: Be careful while replacing thyroxine as it may precipitate angina and myocardial infarction if underlying coronary artery disease.

Myxedema coma

It is caused by severe hypothyroidism, particularly in the elderly, with reduced consciousness, coma and convulsions; with high mortality (50%).

Causes of comma in myxedema:

- SIADH (precipitated by hyponatremia)
- Hypoxemia, hypercapnia
- Hypothermia
- Hypoglycaemia
- Cardiac failure, infection

Treatment:

- Admit in ICU. Take blood samples for FT3, FT4, TSH and cortisol before initiating treatment.
- ***IV T3:*** 20 μg 8 hourly (parenteral T3 has rapid onset of action as compared to oral T4 which has slow onset of action. There is no parenteral formulation for T4). Give oral thyroxine through Ryle's tube, if parenteral T3 is not available.
- ***Hydrocortisone:*** 100 mg IV 8 hourly (particularly if hypothyroidism is suspected)
- ***Supportive therapy:***
    - Rewarm gradually
    - Give high flow O_2
    - IV fluids and dextrose solution
    - Antibiotics, if suspicion of infection
    - Mechanical ventilation (if required)

▶ SUBCLINICAL HYPOTHYROIDISM

It is a clinically euthyroid state which may convert into overt hypothyroidism over years. TSH is slightly ↑ but FT3 and FT4 are within the lower limit of normal range. Repeat TSH after 3-6 months.

Treatment

- ***Thyroxine:***
    - If vague symptoms
    - TSH persistently > 10 mU/L
    - ↑thyroid antibodies titres (anti-TPO Ab) or lipid abnormalities
    - If pregnant to avoid any adverse effect in foetus

▶ SICK EUTHYROID SYNDROME

It is the abnormal thyroid function tests in a euthyroid patient during critical nonthyroidal illness or post-operatively.

Causes:

- Post MI
- Severe pneumonia
- Stroke
- Drugs (steroids and dopamine)

Investigations:

- TSH normal; T4 & T3 normal or ↓ (levels slightly below normal range)
- Repeat TFTs once recovered
  Don't check TFTs in severe nonthyroidal illness, unless strong clinical suspicion of thyroid disease including goitre and exophthalmos.

Pathophysiology: Thought to be mediated by IL-1 and IL-6.

- ↓ hypothalamic/pituitary TSH synthesis resultantly ↓T4 & T3
- ↓ TBG production or ↓ affinity to T4 & T3
- ↓ peripheral conversion of T4→T3, occasionally more rT3 (inactive reverse T3)

▶ HASHIMOTO'S THYROIDITIS

It is autoimmune thyroiditis, common in middle aged woman, with destructive lymphocytic infiltration of thyroid gland leading to gland atrophy and regenerative changes with goitre formation (diffuse moderately enlarged, firm or rubbery goitre)

25% of cases are hypothyroid at presentation, remaining have normal or ↑TSH but normal T4 with future risk of developing overt hypothyroidism. The patient may also initially present with manifestations of thyrotoxicosis, called Hashitoxicosis.

Investigations:

- Antithyroid antibody (very high, >1000 IU/L)
  - Anti TPO antibody (anti-microsomal) in 90%
  - Antithyroglobulin antibodies
    (TSH-receptor antibody normal)
  - ANF may be positive in young patients (<20 years)
- Radio-iodine uptake scan
  - Initially: increased (thyrotoxic phase)
  - After few days or weeks: normal uptake (euthyroid phase)
  - Later: reduced uptake (hypothyroid phase)
- Histological findings
  - Lymphocyte infiltration
  - Hyperplasia and fibrosis
  - Hurthle cell

Treatment

- Thyroxine

Associations:

- Addison's disease
- DM
- Premature ovarian failure
- RA, Sjogren's syndrome, ulcerative colitis, autoimmune haemolytic anaemia

▶ HYPOTHYROIDISM IN PREGNANCY

Hypothyroidism during pregnancy poses diagnostic difficultly because many features of hypothyroidism are also normally present during pregnancy like cold skin, cold intolerance, weight gain, constipation. Therefore, diagnosis requires high degree of clinical suspicion.

Investigations:

- TSH ↑ (most sensitive investigation)
- FT4 and FT3
  (Total T4 and T3 is not reliable as it may be high during pregnancy due to ↑TBG)

Treatment

- Thyroxine 100 - 150 ug OD. Thyroxine requirement is increased by 40 - 50% partly due to ↑ metabolism in the placenta and partly due to ↑TBG levels which binds free thyroxine resulting in ↓FT4 and FT3. Thyroxine dose is adjusted to normalize TSH (monitor trimester specific serum TSH and FT4 in each trimester)

2. Graves' disease (with thyrotoxicosis)

▶ HISTORY (CHIEF COMPLAINTS)

Details of sweating and heat intolerance

- **Duration:** *"Since how long you have excessive sweating and heat intolerance?*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Aggravating or relieving factors:** *"Any preference for cold environment?"*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Associations (D/D):**
  - ***Non-gastrointestinal:***
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***Diabetes mellitus:*** *"Any increased frequency of water works or increased thirst?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood?"*
    - ***Intentional:*** *"Any dieting?" (Dieting/diet pills, exercise, laxatives/diuretics, amphetamines, orlistat, fenfluramine, and thyroxine)*
    - ***Anxiety neurosis / depression:*** *"Any stress at job, home or marital conflict?"*
  - ***Gastrointestinal:***
    - *"Is there any change in your appetite?" (Weight loss despite good appetite)*
    - ***Primary neoplasm:*** *"Any difficultly in swallowing, tummy pain, nausea / vomiting, any blood in vomiting or bowel works, any altered bowel habit?"*
    - ***Malabsorption syndromes (coeliac disease, Crohn's disease):*** *"Any bulky, foul smelling and difficult to flush away bowel works, any diarrhoea?"*

Details of palpitations

- *"How does it feel like? ... Do you feel any racing or thumping of heart in the chest? .... How fast it is? ...... Does it tap out of the rhythm? ... Can you tap it out on the desk? ... Have you felt any missed beat? ... Did the next beat feel heavier?"*
- *"Did you ever check your pulse at that time? ... How fast it was? ... Was it regular or irregular?"* **(Regular: SVT, 2: 1 block; or irregular AF, variable block)**

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"Does it start and stop abruptly?* **(SVT)** *... Does it appear under specific situation or activity or any specific time?"*
- **Severity:** *"How long it persists? ...... How fast did the heart race?"*
- **Ever had it before:** *"Have you ever had it before? ... How often do you have it? ... How long ago you had the last attack?"*
- **Associations (D/D):**
  - *"Any heat intolerance or preference to cold, weight loss with increased appetite, shaking of hands?"* **(Thyrotoxicosis)**
  - *"Any chest pain, shortness of breath, swelling of feet?"* **IHD, MS, MR, AS, HOCM; PE, COPD, asthma, chest infections (Heart/Lungs)**
  - *"Any panic attacks, profuse sweating, headache, faints or funny turns on standing from sitting position, and raised BP?"* **(Pheochromocytoma)**

Details of other complaints

- Insomnia, irritability, restlessness, amenorrhoea, occasional loose motion without any mucus or blood in it and without relation with any food or milk

▶ GENERAL EXAMINATION

As per findings

- Emaciated, anxious looking
- Starring gaze, bilateral exophthalmos, periorbital edema
- Signs of thyrotoxicosis (warm sweaty palm, fine tremor of outstretched hands, tachycardia)
- Pretibial myxoedema

▶ SYSTEMIC EXAMINATION

Thyroid Gland

Inspection:

- It is diffusely enlarged measuring approximately ____ x ____ cm; ____ lobe is slightly larger than the other one. The swelling moves up with swallowing but does not move with tongue protrusion.

Palpation:

- The gland is soft, nontender and mobile; surface is smooth, not adherent to overlying skin or underlying structures. There is no cervical lymphadenopathy.

Percussion:

- There is no retrosternal extension of thyroid gland as the percussion note over sternum is resonant.

Auscultation:

- Bruit over the right lobe

Eyes:

- ***Exophthalmos, lid retraction and lid lag:*** present or absent
- ***Eyeball movements:*** normal in all directions
- ***Joffroy's sign:*** Lack of wrinkling of forehead when a patient looks up with the head bent forwards (occurs with exophthalmos in Graves' disease)
- ***Mobius' sign:*** inability to maintain convergence of the eyes in patients with Graves' disease
- ***Stellwag's sign:*** infrequent or incomplete blinking associated with exophthalmos or Graves orbitopathy

Hands:

- Fine tremors of the outstretched hands

Lower limbs:

- ***Grave's dermopathy:*** Look for pretibial myxedema
- ***DTR:*** slightly brisk
- ***Proximal myopathy:*** Difficulty in standing up from sitting position

Examination of other systems

- No other abnormalities detected.

"My diagnosis is thyrotoxicosis due to Graves' disease."

Based on diffuse enlarged goitre, bilateral exophthalmos and pretibial myxedema (Grave's dermopathy). (otherwise tell thyrotoxicosis as diagnosis, if there is no exophthalmos. Examiner may then ask the about the likely cause of thyrotoxicosis. The answer even then be Graves' disease, being the commonest. Do tell the other common causes of thyrotoxicosis as well)

Differential diagnosis

- Toxic multinodular goitre (small nodules may not be palpable clinically, but can be detected by USG thyroid)
- Toxic nodular goitre

DISCUSSION

▶ INVESTIGATIONS

- **For thyrotoxicosis confirmation:**
  - ***FT3, FT4, and TSH:*** TSH↓, T3 & T4↑; in T3 toxicosis, TSH↓ & T4 is normal, but T3 is ↑.
  - ***Radioiodine uptake test (RAIU) and thyroid scan:***
    - Rapid uptake and rapid turnover (high uptake at 2, 4 and 24 hours. After 48 hours, uptake falls). Technetium scintigraphy has advantage over RAIU test as it can be done quickly and need low dose of radioactivity. (Normal RAIU after 2 hours: 5 - 15 % and after 24 hours: 15 - 30 %)
- **For finding out causes:**
  - ***USG neck:*** for confirming single, multinodular and diffuse goitre
  - ***Thyroid autoantibody:*** (in Graves' disease)
    - **Thyroid receptor antibody (TRAb):** Thyrotoxicosis is caused by TSH receptor stimulating antibody (TSI).
    - **Anti TPO and anti-thyroglobulin antibody:** ↑ slightly to moderately in Graves' disease but very high in Hashimoto's thyroiditis
  - ***FNAC:*** if goiter
- **Other tests:**
  - ECG
  - CXR: For retrosternal extension of goiter and cardiomegaly
  - Ocular USG, CT scan orbit: for ophthalmopathy

Causes of thyrotoxicosis with low radioiodine uptake

- De Quervain's thyroiditis (Subacute thyroiditis)
- Postpartum thyroiditis
- Amiodarone induced thyroiditis type 1 or iodine induced
- Ectopic thyroid tissue (hydatidiform mole, choriocarcinoma and struma ovarii)
- Factitious thyrotoxicosis

▶ TREATMENT

A. Drugs:

- ***Carbimazole or propylthiouracil:*** (reduce thyroid hormones synthesis by inhibiting the tyrosine iodination)
  - **Carbimazole:** Start 45-60 mg OD, reducing to 5-20 mg once euthyroid and continued for 18-24 months. Carbimazole may cause agranulocytosis so periodic CBC is necessary. Advise to stop carbimazole if sore throat or fever develops and inform the doctor. Monitor FT4 and TSH.
  - **Propylthiouracil:** 400-600 mg daily, reducing the dose once euthyroid.
- ***β-blocker:*** Give propranolol up to 160 mg/day to minimize tremors, tachycardia and sweating (sympathetic symptoms).

Indications:

- < 40 years
- Small goitre
- Mild symptoms of thyrotoxicosis

Disadvantages:

- 50% patients experience relapse on stopping the drug within 2 years
- Hypersensitive skin rash and agranulocytosis
- Issue of compliance
- Costly

B. Radioiodine therapy:

(Destroy and inhibit the replication of functioning thyroid cells)

- Give 5-10 mCi of radioiodine PO according to the size of goitre. It is effective in 4-12 weeks in 75% cases. Propranolol is given during the window period to control sympathetic symptoms. start carbimazole if there is severe thyrotoxicosis 48 hours after radioiodine therapy (efficacy of radioiodine is reduced if given within 48 hours). Second dose of radioiodine is given after 12-24 weeks if no response to first dose.

- If severe thyrotoxicosis, give carbimazole for 4-8 weeks prior to radioiodine but stop it 48 hours before radioiodine therapy.

Indications:

- > 40 years of age
- < 40 years with other major serious illness
- Ablative therapy in severe atrial fibrillation or heart failure
- Toxic MNG or toxic adenoma or hot nodule (treatment of choice in toxic nodular or MNG is radioiodine therapy or surgery. Drugs are not helpful)
- Recurrence post-thyroidectomy or after drugs (irrespective of age)
- Thyroid carcinoma (follicular, papillary after surgery)
- Psychosis
- Poor drug compliance
- Drug hypersensitivity

Contraindications:

- Pregnancy or planned pregnancy within 6 months of radioiodine therapy
- Lactation
- Active or malignant Graves' ophthalmopathy

Disadvantages:

- Exacerbation of ophthalmopathy
- Hypothyroidism: 40% in first year and 80% in next 15 years
- Discomfort and exacerbation of thyrotoxicosis (radiation thyroiditis). Achieve euthyroid status using drugs before radioiodine therapy, and the drugs must be stopped 2 - 5 days prior to radioiodine therapy.

C. Subtotal thyroidectomy:

- Patient should be made euthyroid by antithyroid drug before operation. Add potassium iodide 60 mg 8 hourly two weeks before operation (inhibits release of thyroid hormone and, reduces the size and vascularity of thyroid gland which makes surgery technically easier).

Indications:

- Cosmetic reasons
- Multinodular or large goitre
- Noncompliance or hypersensitivity with ant-thyroidal drugs
- Relapse or non-responder to ant-thyroidal drug
- Suspected neoplastic change
- Pressure effect

Complications:

- Recurrent laryngeal nerve palsy (1%)
- Transient hypocalcaemia (10%)
- Permanent hypoparathyroidism (1%)
- Hypothyroidism (25%)

GRAVES' DISEASE

It is an autoimmune disease of thyroid caused by production of antibodies against TSH receptors (TRAb IgG). TRAb acts similar to TSH and is of two types:

- TSI (thyroid stimulating immunoglobulin) 80 - 95%, causes thyrotoxicosis
- TSH receptor blocking antibody, causing hypothyroidism

▶ CLINICAL FEATURES

Triad of diffuse goitre, Grave's ophthalmopathy (exophthalmos) & Grave's dermopathy (pretibial myxedema)

Course of Graves' disease

Hyperthyroidism, euthyroidism followed by hypothyroidism.

- ***Euthyroid Graves' disease:*** Clinical features of Graves' disease (ophthalmopathy, diffuse goitre and dermopathy) + Euthyroid state (clinical & biochemical)
- ***Hypothyroid Graves' disease:*** Features of Graves' disease (ophthalmopathy, diffuse goitre and dermopathy) + hypothyroid state:
    - Hypothyroid facies: Coarse facial features, baggy eye lids, periorbital puffiness
    - croaky voice (coarse husky)
    - Cold and dry skin
    - Non pitting edema (Graves' dermopathy or pretibial myxedema)
    - Delayed relaxation of DTR (ankle jerks)

Thyroid bruit

Results from increase vascularity in thyroid gland and is pathognomonic of Graves' disease.

Thyroid ophthalmopathy

Fibroblast proliferates within the orbit mediated by cytokine, which then secretes hydrophilic glycosaminoglycans causing excessive interstitial fluid and chronic inflammatory cells infiltration leading to

- Extra-ocular muscles swelling and edema
- Raised retrobulbar pressure pushing the eyeball forward (proptosis) and compressing the optic nerve in severe cases

Clinical features:

- Increased lacrimation, grittiness of eyes, conjunctivitis, corneal ulcer, reduced visual acuity and diplopia
- Malignant exophthalmos: Severe exophthalmos which threatens vision due to compression of optic nerve
- Ophthalmopathy does not relate to the onset of thyrotoxicosis, rather it may be present in euthyroid or hypothyroid states. Even it may appear years before and may appears years before it. Exophthalmos may aggravate if hypothyroidism develops especially post-radioiodine therapy.

Risk factors:

- Poor control of thyroid function
- Post-radioiodine therapy
- Smoking

Treatment:

- ***Reassurance:*** Resolution of lid retraction occurs once patient is euthyroid, but resolution of exophthalmos is slow that may take 2-3 years.
- ***General treatment:***
    - **Grittiness relief:** Methylcellulose eyedrops
    - **Prevention of exposure keratitis:** tinted glasses
    - **Corneal ulcer:** lateral tarsorrhaphy
- ***Steroids:***
    - Prednisolone 60-120 mg/daily indicated if ↓visual acuity, visual field defect, papilledema or worsening exophthalmos
    - Pulse methylprednisolone and cytotoxic drug (cyclophosphamide)
- ***Orbital irradiation:*** for severe cases
- ***Orbital decompression:*** if no improvement within 7 - 10 days or reduced visual acuity
- ***Corrective surgery for diplopia:*** Delay corrective eye muscles surgery for 6 months till the diplopia is stable.

Eponyms of eye signs in thyroid disease:

- ***Joffroy's sign:*** Absence of wrinkling of forehead on upward gaze
- ***Von Graefe's sign:*** Lid lag
- ***Stellwag's sign:*** Infrequent blinking
- ***Moebius' sign:*** Impaired convergence of eye

- ***Jendrassik sign:*** Paralysis of extra-ocular muscles
- ***Ballet sign:*** Weakness of at least one extra-ocular muscle

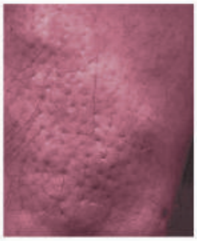
Pretibial myxedema (dermopathy) - 10% cases

(pretibial myxedema is a misnomer as it is not a manifestation of hypothyroidism)

- Caused by deposition of mucopolysaccharide in the dermis.
- Almost always associated with ophthalmopathy
- Occasionally develops post-radioiodine therapy for Grave's thyrotoxicosis.

Clinical feature

- Pink or brown plaque-like thickened nodular lesion, giving a peau d'orange appearance in the shins up to the dorsum of feet (any site may be involved particularly pressure points). It may be hyperpigmented and pruritic.



Treatment:

Rarely required

- Intralesional steroid injection (Triamcinolone)
- Betamethasone ointment

THYROTOXICOSIS

- AF or heart failure may be the only features of thyrotoxicosis in the elderly while other typical features of thyrotoxicosis may be masked. Children may present with behaviour problems like hyper-reactivity; excess growth and weight gain instead of loss.
- The elderly may also present with apathetic thyrotoxicosis where the features of thyrotoxicosis may be associated with hypothyroid features. The diagnosis of such cases require high degree of suspicion.

▶ CAUSES

- Graves' disease (most common)
- Toxic MNG
- Toxic nodular goitre
- Thyroiditis
  - Postpartum thyroiditis
  - De Quervain's thyroiditis (Subacute thyroiditis)
  - Hashimoto's thyroiditis (Hashitoxicosis)
- Factitious thyrotoxicosis
- Iodine induced thyrotoxicosis (Jod-Basedow's phenomenon) and drug induced thyrotoxicosis (amiodarone)
- Others:
  - Thyroid carcinoma (follicular)
  - Hydatidiform mole & choriocarcinoma (secrete TSH)
  - Struma ovarii (secretes thyroid hormones)

Factitious thyrotoxicosis

- High thyroid hormones
- ↑ ratio of T4:T3 = 70:1 (ratio is 30:1 in conventional thyrotoxicosis)
- Thyroglobulin level zero or low
- Low radioiodine uptake

▶ THYROTOXIC PERIODIC PARALYSIS

Sudden or periodic weakness in a thyrotoxic patient due to hypokalaemia, persisting for 7 – 72 hours. It may follow excess carbohydrate intake or after vigorous exercise. It improves when thyrotoxicosis is treated.

▶ THYROTOXICOSIS WITH AF

- ***β-blocker:*** Give propranolol. Use verapamil or amiodarone if β-blocker is contraindicated (digoxin has little role).
- ***Antithyroid drug / radioiodine therapy***
- ***Anticoagulant:*** aspirin, warfarin

- ***Cardioversion:*** spontaneous restoration to sinus rhythm in 50% of cases. Cardiovert if persistent AF, provided FT4 and TSH are normal.

▶ THYROTOXICOSIS IN PREGNANCY

The usual cause of thyrotoxicosis during pregnancy is Graves' disease. The other autoimmune thyroid diseases are relatively less common during pregnancy as the maternal immune response is suppressed. Chances of conception are reduced as anovulatory cycles are frequent. The foetus may develop thyrotoxicosis as TRAb (TSI) can cross placenta.

Investigations:

- ↑FT4 & FT3 and ↓TSH (thyrotoxicosis in pregnancy is difficult to diagnose as symptoms of thyrotoxicosis and pregnancy overlap e.g. palpitation. Thyroid function test is also misleading, albeit TSH is usually reliable. There is ↑TBG, total T4 and T3, while TSH is ↓)

Treatment:

Antithyroid drugs can cross the placenta and breast milk and can cause neonatal/infantile hypothyroidism. Block and replace regimen is contraindicated in pregnancy as both carbimazole and PTU cross placenta far better than thyroxine so may induce fetal hypothyroidism. Radioiodine therapy is contraindicated in pregnancy and breastfeeding, and it is recommended that patients avoid becoming pregnant for 6 months after therapy.

- **Propylthiouracil (PTU) in the 1st trimester (during organogenesis), carbimazole in 2nd and 3rd trimesters:** Carbimazole crosses placenta and carries small risk of fetal abnormalities including fetal goitre, aplasia cutis (scalp skin defect) if used in first trimester. PTU use is limited to first trimester only due to severe PTU related liver failure. Propylthiouracil is given in lowest effective dose (<150 mg daily) maintaining euthyroidism (keep T4 within the upper limit of normal range) to prevent fetal hypothyroidism and goitre. Many endocrinologists, however, begin with PTU in early pregnancy, but in practice there is little difference between PTU and carbimazole.
- Measure TRAb in last trimester, if not high, stop the drug 4 weeks prior to delivery in order to prevent neonatal hypothyroidism.
- Neither PTU nor carbimazole is recommended in breastfeeding, but if patient insists to breastfeed, switching to PTU post-delivery is potentially the safer option as there is little drug excretion in breast milk.
- Subtotal thyroidectomy, if necessary, should be done in second trimester.

▶ THYROID STORM

Thyroid storm is characterized by life threatening symptoms. Mortality rate is 10%.

Clinical features:

- High grade fever
- Restlessness, agitation and irritability
- Tachycardia or AF; cardiac failure in elderly
- Nausea, vomiting, diarrhoea and abdominal pain
- Confusion, delirium and coma

Precipitating factors:

- Unprepared surgery
- Infection
- Stress
- Radiation thyroiditis

Investigations:

- FT3, FT4 and TSH

Treatment:

- Admit in ICU. Take blood sample for FT3, FT4 and TSH
- IV fluids: normal saline and glucose
- Control temperature and give supplemental O_2 if needed.
- Propranolol PO 80 mg 6 hourly (or IV 1-5 mg). Amiodarone is also effective.

- Carbimazole 40-60 mg or propylthiouracil 150 mg QID daily (both can be given through Ryle's tube if needed; carbimazole can be given per rectally as well)
- Sodium ipodate (radiographic contrast medium) 500 mg /day is rapidly effective. Lugol's iodine or potassium iodide may be given.
- Dexamethasone 2 mg QID IV
- Broad spectrum antibiotics
- Maintain on carbimazole after 10-14 days.

DIFFERENCES BETWEEN GRAVES' DISEASE AND TOXIC MNG

Features	Graves' disease	Toxic multinodular goitre
Age of onset	20 - 40 years	Middle aged or elderly
Past medical history	-	Nodular goitre for long time
Etilology	Autoimmune	Usually iodine deficiency
Thyroid gland	Diffusely enlarged	Multinodular goitre
Ophthalmopathy	Common	-
Dermopathy	Common	-
Thyroid acropachy	May occur	-
Heart complications	Less common	More common
Hypothyroidism	Later may occur	No

3. Cushing's syndrome

▶ HISTORY (CHIEF COMPLAINTS)

Details of weight gain and difficulty in standing from sitting position

- *"Where exactly you are putting weight in your body?'* **(Distribution of fat)**

- **Duration:** *"Since how long your weight is increasing?"*
- **Progression:** *"Is it worsening with time? ... Is there any change in your appetite?"*
- **Severity:** *"How much weight you have gained? ... What was your previous weight?"*
- **Associations (D/D):**
  - ***Glands:***
    - *"Do you have any skin changes like thinning, striae or bruising; hair growth/acne; difficulty in climbing stairs or standing up from a sitting position; irregular or missed menstrual periods, poor libido; hypertension, worsening diabetes; bony fractures?"* ***(Cushing's)***
      - Alcoholism, polycystic ovarian syndrome **(Pseudo-Cushing's)**
      - Excessive use of oral or topical corticosteroids **(Iatrogenic Cushing's)**
    - *"Do you have any intolerance to cold or preference to warm environment; constipation; any change in voice or hoarseness; dryness and roughening of skin; tingling, numbness of hands or feet; thyroid surgery, radiation to the neck; any difficult childbirth during the last 6 months; any excessive menstrual bleeding?"* ***(Hypothyroidism)***
    - *"Any progressive enlargement of body parts with increase in ring or hat size?"* ***(Acromegaly)***
  - ***Excessive diet, lack of exercise, alcohol***
  - ***Drugs:*** Insulin, sulfonylurea, OCPs, steroids, antipsychotics

Details of weakness and lethargy

- **Duration:** *"Since how long you are feeling weakness and lethargy?"*
- **Severity:** *"How bad is it?"*
- **Progression:** *"Is it progressively worsening?"*

Details of backache

- **Site of pain:** *"Where exactly the pain is? ... Can you point it?"* (low back pain. Pain in any other joints)
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull? ...... Is it a constant, pain or it comes and goes?"*
- **Radiation:** *"Does it move along the legs?"*
- **Associations (D/D)—**
  - ***Vertebral body collapse / compression:*** *"Do you have any trauma to the back, history of fall or lifting a heavy weight?"*

  If radicular pain think of
    - Intervertebral disc herniation
    - Cord compression
    - Spinal stenosis
  - ***Multiple myeloma or Metastatic bone disease*** *(from lungs or breast, Ca prostate):* *"Do you have any fever, weight loss; cough or any phlegm with blood; any problem with your bowel or water works?"*
  - ***Seronegative spondyloarthropathy:*** *"Do you have any stiffness in lower back and pain in your other joints?"*
  - ***Brucellosis, septic arthritis***
  - **Osteoporosis:** *Early menopause, oophorectomy, smoking, nutrition deficiency, corticosteroids, smoking, lack of exercise. Do ask about HRT.*
- **Timings/duration:** *"Since how long you have the pain? ...Is it constant, or comes and goes?"*

- **Exacerbating & relieving factors:** *"What makes it better? ..... What makes it worse?"* worsens with activity and improves by taking rest. Relieves with medicines.
- **Severity:** *"How bad it is on a scale of 1-10? ...... How badly it is affecting your life including work and sleep?"*

Details of bleeding spots on the skin

- *"Where exactly the rash is? .... Do you have rash anywhere else?* **(site)**
- *"How does it look like? ... Can you feel it? ... Does it disappear when you press it?"* **size, colour, shape (flat or raised), blanchability, itchy (Description)**

- **Duration:** *"Since how long it has been present?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Ever had it before:** *"Have you ever had the rash before?"*
- **Associations (D/D):**
  - ***Bone marrow failure:*** **(leukemia, marrow infiltration by malignancy, metastatic)**
    - *"Do you have bleeding from any site like gums, nose, in bowel works or water works, any vaginal bleeding or heavy periods?"*
    - *"Any difficulty in breathing, tiredness or racing of heart on walking?"*
    - *"Any fever or lumps in the body?"*
  - ***ITP:*** *"Did you have flu like illness before the rash?"*
  - ***Connective tissue disorders:*** SLE, APLAS
    - *"Any joint pains, oral ulcers, rash over sun-exposed areas, recurrent miscarriages?"*
  - ***HIV***
  - ***Liver disease:***
    - *"Any swelling of your feet or tummy, any change in your sleep pattern, any blood in your bowel works or vomiting containing blood?"*
  - ***TTP-HUS, DIC***
  - ***Drugs:*** heparin, warfarin, aspirin; steroids, sulphonamides, chloramphenicol.
  - ***Henoch-Schönlein purpura***
  - ***Infections:*** EBV, CMV, toxoplasmosis, dengue, HIV
  - ***Scurvy:*** lack of fresh fruit and vegetables

▶ GENERAL EXAMINATION

- Cushingoid facies with moon like puffy, plethoric face + acne + hirsutism / virilism
- Supraclavicular and interscapular fat pad (Buffalo hump at the base of neck)
- Lean and thin limbs with truncal obesity **(lemon on a matchstick appearance of abdomen)**
- Acne vulgaris on the face and trunk
- Purpuric and petechial rashes consistent with bruising and thin skin
- Violaceous striae on the abdomen, back and axilla (Pink / purple striae)
- BP 155/90 mmHg

▶ SYSTEMIC EXAMINATION

A. Abdomen

- No adrenalectomy scars
- No ascites although abdomen appears full due to central obesity

B. Nervous System

- ***Motor system:*** Proximal muscle weakness in both shoulder and hip girdle

C. Musculoskeletal system

- ***Proximal myopathy:*** Both in upper and lower limbs
- ***Spine tenderness:*** tenderness over lumbar spine (secondary to osteoporosis)

Examination of other systems

- No other abnormalities detected.

"My diagnosis is Cushing's syndrome."

Differential diagnoses

- Simple obesity
- Metabolic syndrome
- Hypothyroidism
- PCOS (in early age)

DISCUSSION

▶ CLINICAL FEATURES

- Weight gain but weakness
- Moon like puffy, plethoric face + acne + hirsutism / virilism
- Buffalo hump / supraclavicular fat pad
- Truncal obesity with lemon on a matchstick appearance (abdomen)
- Pink /purple abdominal striae
- Easy bruising
- Proximal myopathy (difficulty in raising the hands above the head & combing; standing from sitting position)
- Spine tenderness or backache (osteoporotic fracture)
- IGT or DM; HTN
- Hypokalaemia
- Recurrent infections, delayed wound healing
- Depression, irritability, lethargy
- Amenorrhea or oligomenorrhea, loss of libido

Clinical differentiation of different types of Cushing's syndrome

A. ***Cushing's syndrome due to adrenal cause:***
  - ***Adrenal adenoma:*** clinical features of glucocorticoid excess are present but no androgenic features like hirsutism & virilisation. No pigmentation
  - ***Adrenal carcinoma:*** clinical features of glucocorticoid excess are present and androgenic features like hirsutism and virilisation are rapidly progressive. No pigmentation.

B. ***Cushing's syndrome due to ectopic ACTH secretion:***
  - ↑pigmentation (due to ↑ACTH), weight loss (instead of obesity), severe hypokalemic alkalosis and features of the primary cause. Marked hypokalaemia suggests ectopic ACTH syndrome.

C. ***Cushing's disease:***
  - Classic features of Cushing's syndrome; headache due to raised intracranial pressure, visual disturbance and features of hypopituitarism if there is pituitary macroadenoma.

D. ***Pseudo-Cushing's syndrome:***
  - History of alcoholism, depression or simple obesity

▶ CAUSES

Cushing's disease	→	Pituitary (microadenoma / basophil adenoma)	→	Pigmentation + Weight gain
Cushing's syndrome	→	Adrenal (Adenoma / carcinoma) Ectopic ACTH (Bronchial Ca / Ca Pancreas)	→ →	No pigmentation BUT weight gain Pigmentation + weight loss Instead of weight gain
Iatrogenic Cushing's (Commonest cause)				

Cushing's disease is caused by ↑ACTH production from pituitary leading to ↑ adrenals stimulation. Cushing's syndrome results from excess glucocorticoid due to any cause.

Pseudo-Cushing's:

- It is the cortisol excess caused by other illnesses without involvement of the pituitary adrenal axis. Features of Cushing's syndrome like bruises, myopathy and hypertension are usually absent in Pseudo-Cushing's syndrome.

Causes:

- Obesity
- Chronic alcoholism
- Severe depression
- PCOS
- Pregnancy

Investigations

- ↑ urinary excretion of steroids, absent cortisol diurnal variation and failure of cortisol suppression by dexamethasone.
- Insulin induced hypoglycaemia
  - Pseudo-Cushing's syndrome: excess cortisol secretion
  - Cushing's syndrome: almost no response

INVESTIGATIONS

1st line Screening test
(1st visit)

- 24 hours urinary free cortisol ↑
- Overnight dexamethasone suppression test **(No suppression)**
  1 mg PO at 11 PM, Cortisol at 9 AM
  Normally almost total suppression of cortisol (< 100 nmol/ L)

⇓

2nd line screening test
(2nd visit)

- Check cortisol circadian rhythm - lost **(High midnight cortisol)**
  Cortisol midnight at 12 PM, 8 AM
- Low dose dexamethasone suppression test **(No suppression)**
  0.5 mg PO 6 hourly X 02 days, cortisol at 9 AM (0, 2 days)

⇙

Cortisol suppression
Psuedo-cushing

⇓

- ACTH Levels

⇙ ⇘

ACTH Undetectable
Adrenal Cause

⇓

- USG or CT Adrenals
- Adrenal vein sampling

ACTH ↑

⇓

- High dose 48 hours dexamethasone suppression test
  2 mg PO 6 hourly X 02 days, cortisol 9 AM (0, 2 days)

⇙ ⇘

Cortisol Suppressed
Pituitary Cushing's Disease

⇓

- MRI Pituitary
- Inferior petrosal sinus sampling

Cortisol NOT Suppressed
Ectopic ACTH

⇓

- CXR / CT Chest
- CT Abdomen (Ca Pancreas)
- Tumor markers

Note:

Reason for using dexamethasone in suppression test is that it does not cross react in radioimmunoassay for cortisol, but other steroids do.

▶ TREATMENT

• **Cushing's Disease (Pituitary)**	↱	Trans-sphenoidal Surgery (microadenoma)	
	↱	Pituitary irradiation	
	→	Bilateral adrenalectomy (not done now) →	↑↑↑ ACTH (Nelson's syndrome) ↑ size of pituitary
	↳	Adrenolytic drugs (Mitotane / Metyrapone)	
• **Adrenal tumor**	↗	Adrenalectomy	
	↘	Adrenolytic drugs (Mitotane / Metyrapone)	
• **Ectopic**	→	Treat primary	

Ketoconazole is an effective agent for control of cortisol synthesis prior to surgery.

Nelson's syndrome

In Cushing's disease, bilateral adrenalectomy causes pituitary tumor enlargement as there is no negative feedback suppression by cortisol from adrenals, and excess ACTH leads to increased pigmentation.

Treatment:

- Surgical removal of pituitary tumor
- Pituitary radiotherapy post-adrenalectomy

▶ CAUSES OF DEATH

- Infections
- Acute MI & heart failure
- Hypertension and its complications

▶ CAUSES OF ADBOMINAL STRIAE

White or pink wrinkled linear skin marks caused by rupture of elastic fibres due to stretching of skin.

- **Striae gravidarum:** white/pink lines on lower abdominal skin (below umbilicus) appearing during pregnancy
- **Obesity:** longitudinal white narrow lines caused by obesity
- **Cushing's syndrome:** pink, purple or red; horizontal or oblique; wide lines (caused by increased vascularity)

▶ CAUSES OF MOON-LIKE OR PUFFY FACE

- **Cushing's syndrome:** puffy plethoric moon-like face with acne and hirsutism
- **Myxedema:** puffy face with coarse facial features, baggy eyelids, hair loss on outer 1/3 of eyebrows
- **Nephrotic syndrome and acute GN:** puffy face, periorbital oedema
- **SVCO:** plethoric face with subconjunctival effusion, engorged and non-pulsatile neck veins
- **Angioedema:** localized with swollen lips or face
- **Simple obesity**

▶ CAUSES OF PERIORBITAL EDEMA

- Nephrotic syndrome, acute GN
- Myxedema, malignant exophthalmos
- Angioedema
- Orbital cellulitis
- Dermatomyositis

▶ INDICATIONS OF LONG-TERM STEROID THERAPY

- Addison's disease and hypopituitarism (lifelong)

- Pemphigus vulgaris
- Giant cell arteritis
- SLE, dermatomyositis
- Idiopathic fibrosing alveolitis
- Chronic active hepatitis (CAH)

Absolute indications of steroids therapy

- Addison's disease, bilateral adrenalectomy
- Severe SLE
- Pemphigus vulgaris
- Giant cell arteritis

4. Addison's disease

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness and weight loss

- **Duration:** *"Since how long you are feeling weakness and weight loss?"*
- **Progression:** *"Is it getting better or worsening with time?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change? ...... How much weakness do you feel?* (Severe weakness with progressive weight loss of about ___ kg)
- **Associations (D/D):**
  - ***Non-gastrointestinal:***
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***Diabetes mellitus:*** *"Any increased frequency of water works or increased thirst?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood?"*
    - ***Intentional:*** *"Any dieting?" (Dieting/diet pills, exercise, laxatives/diuretics, amphetamines, orlistat, fenfluramine, and thyroxine)*
    - ***Anxiety neurosis / depression:*** *"Any stress at job, home or marital conflict?"*
  - ***Gastrointestinal:***
    - *"Is there any change in your appetite?" (Weight loss despite good appetite)*
    - ***Primary neoplasm:*** *"Any difficultly in swallowing, tummy pain, nausea / vomiting, any blood in vomiting or bowel works, any altered bowel habit?"*
    - ***Malabsorption syndromes (coeliac disease, Crohn's disease):*** *"Any bulky, foul smelling and difficult to flush away bowel works, any diarrhoea?"*

Details of nausea, loss of appetite, dizziness & vertigo

- **Duration:** *"Since how long you are having loss of appetite, nausea, dizziness and vertigo? ...... When you feel dizziness and vertigo?"* (while standing or sitting from lying position)
- **Progression:** *"Is it getting better or worsening with time?"*

Details of pigmentations in different body parts

- **Duration:** *"Since how long you have noticed pigmentation? ... Where you have the pigmentation?"*
- **Progression:** *Is it progressively worsening?*

▶ GENERAL EXAMINATION

As per findings

- Emaciated and sick looking
- Appears pigmented more obvious over buccal mucosa, palmar creases, knuckles, face, neck, knees, elbows and scar marks
- Vitiligo
- Sparse axillary and pubic hair
- BP: 100/60 mm Hg while lying and 70/40 mm Hg while standing

Examination of other systems

- No other abnormalities detected.

"My diagnosis is Addison's disease."

Differential diagnoses

- TB
- Hemochromatosis

- DM
- Malabsorption syndrome

DISCUSSION

It is caused by destruction of adrenal cortex causing glucocorticoid and mineralocorticoid deficiency.

▶ CAUSES

- **Common causes:**
  - Autoimmune adrenalitis (80%)
  - Tuberculosis
  - Malignant destruction (bronchial carcinoma)
  - Bilateral adrenalectomy
- **Other causes:**
  - Bilateral adrenal hemorrhage following meningococcal septicemia & DIC (Water house Friedrichson's syndrome)
  - Infiltration: hemochromatosis, sarcoidosis, amyloidosis
  - Histoplasmosis: Histoplasma capsulatum, a dimorphism soil fungus. Slowly progressive chronic forms occur in those who are fit and immunocompetent. Those who are weak, very young, or very old or immunocompromised tend to acquire a disseminated infection. Acute infection causes malaise fever, anorexia, and headache. It can cause TB like illnesses with dyspnea, cough, and hemoptysis, or just can cause bilateral hilar lymphadenopathy. Disseminated infection causes bilateral adrenal enlargement in 79% of cases causing adrenal insufficiency. Diagnosis can be confirmed by adrenal biopsy or FNA. Grocott stain the organism. Treat with itraconazole.

▶ CLINICAL FEATURES

- **Pigmentation:** Generalized or on sun-exposed areas like neck, face, knuckles, skin creases (palmar crease), pressure points (elbows, knees) and recent scars (↑ACTH stimulates ↑melanin production)
- **Postural hypotension** (drop in SBP >20 & DBP > 10 mmHg for 03 minutes)**, dizziness,**
- **Generalized weakness, weight loss**
- **Features of primary cause**

Diagnostic criteria:

Triad of:

- Emaciation or weakness (100% of cases)
- Hypotension (88% of cases)
- Pigmentation (90% of cases)

(Other features postural symptoms in 12%, gastroenteritis in 56%, salt craving in 19%).

Clinical presentation:

- Chronic adrenocortical deficiency: weakness, hypotension, pigmentation
- Addisonian crisis

Association:

- Pernicious anaemia
- Graves' disease, Hashimoto's thyroiditis
- Type 1 DM
- Myasthenia gravis
- Vitiligo (10 - 20% cases)
- Primary ovarian failure

▶ INVESTIGATIONS

- **Routine tests:**
  - CBC
  - BSR: low or lower limit of normal
  - ↓Na, ↑K

  - Serum renin↑, aldosterone↓
- **Confirmatory tests:**
  - ***Serum cortisol & ACTH at 9 AM:*** Single diagnostic test for Addison's disease is simultaneous measurement of ACTH and serum cortisol level (ACTH↑ >80 ng/L, cortisol↓). Random cortisol <100 nmol/L is highly suggestive of Addison's disease. Cortisol >460 nmol/L rules out Addison's disease.
  - ***Synacthen test:*** (no need to stop dexamethasone / betamethasone; one dose of hydrocortisone the previous evening is unlikely to affect interpretation of the test)
    - **Short synacthen test:** ACTH 250 mcg IV or IM followed by cortisol measurement at 0,30 minutes

      cortisol at 30 minutes < 550 nmol/L **OR**
      Incremental rise in cortisol < 200 nmol/L
      ↓
      Primary or Secondary deficiency

      Now measure Plasma ACTH to differentiate primary from secondary adrenocortical deficiency. Addison's disease have high ACTH while in secondary adrenocortical deficiency ACTH is either low or undetectable. If ACTH test is not available, then long synacthen test can be done.
    - **Long Synacthen test:** (ACTH 1 mg IM x 03 days, followed by cortisol measurement at 0, 4 ,8, 24 hours every day)

      Progressive rise in cortisol —> secondary deficiency
      No rise in cortisol > 700 nmol/L —> Primary deficiency (look for pigmentation)

      Anti-21 hydroxylase antibodies are typically seen in high percentage (80-90%)
      High TSH and low T4 may occur without hypothyroidism. With steroid, both TSH and T4 revert to normal.
- **Tests to find out causes:**
  - ***CXR:*** Small heart size, look for evidence of TB
  - ***X-ray abdomen:*** look for adrenal calcification in TB
  - ***USG or CT scan of adrenals:*** in TB or malignancy, there could be adrenal calcification
  - ***Anti-Adrenal antibodies:*** autoimmune cases
- **Other tests:**
  - Autoimmune and pernicious anaemia screening
  - FT3, FT4, TSH
  - Tests for suspected causes: e.g. metastatic carcinoma, sarcoidosis, hemochromatosis, amyloidosis, HIV, histoplasmosis etc

▶ TREATMENT

- **Glucocorticoid replacement:** (double dose during infections / stress; increase dose during surgery)

	Morning (after waking)	Afternoon (6 PM)
Hydrocortisone	15 mg	5 mg
Prednisolone	5 mg	2.5 mg

Relative potencies of steroids: Hydrocortisone 25 mg, prednisolone 7.5 mg, dexamethasone 0.75mg

- **Mineralocorticoid replacement:**
  - Fludrocortisone -- 0.05 to 0.15 mg daily
- **Androgen replacement:**
  - DHEA 50 mg/day in females
- **Carry a bracelet and steroid card**
- **ATT** if tuberculosis

Monitoring:

- Proper history regarding overall well-being
- BP and weight measurement
- Serum electrolytes

Remember during stress

- **Trauma or intercurrent illnesses:** Double the steroid dose

- **During surgery:**
  - ***Minor surgery:*** Hydrocortisone 100 mg IV or IM as premedication.
  - ***Major surgery:*** Hydrocortisone 100 mg IV or IM QID for 24 hours then continue 50 mg QID until the patient can take by orally.
- **Gastroenteritis:** replace oral steroids with IV or IM hydrocortisone

▶ PRIMARY VS SECONDARY ADRENOCORTICAL INSUFFICIENCY

Primary	Secondary
Destruction of Adrenal glands	Pituitary involvement or chronic steroid use
Pigmented	Pallor
Hypotension	Normal BP (secretion of aldosterone does not depend on ACTH)
Normal secondary sexual characters	Loss of secondary sexual characters Clinical features of other pituitary hormones insufficiency
High ACTH	Low ACTH
Low Na^+ and high K^+	Usually normal electrolytes
Autoimmune diseases association	No autoimmune diseases association

▶ ADDISONIAN CRISIS

Acute severe adrenocortical deficiency leading to shock and severe hypotension.

Precipitating factors

- Intercurrent illnesses, surgery or infection

Clinical features

- Nausea, vomiting, diarrhoea, acute abdomen; muscle cramps; unconsciousness and collapse

Investigations

- **3S --** Shortage of salt / sugar / steroids
  - Hyponatremia, hyperkalaemia, hypoglycaemia and hypercalcemia

Causes

- Sudden steroid withdrawal after prolong use
- Severe infection, stress and surgery
- Bilateral adrenal haemorrhage (meningococcal septicaemia, anticoagulant and injury)
- Thyroid hormone replacement in hypopituitarism before replacing steroids

Treatment

- IV Hydrocortisone, saline, dextrose (if hypoglycaemia)
- Avoid morphine for pain relieve due to vasodilation

5. Acromegaly

HISTORY (CHIEF COMPLAINTS)

Details of progressive enlargement of the body

- **Duration:** *"Since how long you are experiencing progressive enlargement of body? ... Which parts of the body are enlarging?"* (head, face, jaw leading to difficulty in chewing, feet and hands)
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How much body parts have enlarged?"*

Details of weight gain and weakness

- *"Where exactly you are putting weight in your body?'* ***(Distribution of fat)***
- **Duration:** *"Since how long your weight is increasing?"*
- **Progression:** *"Is it worsening with time? ... Is there any change in your appetite?"* (weight progressively increasing despite normal food intake)
- **Severity:** *"How much weight you have gained? ... What was your previous weight? ...... How much weakness you feel?"* (severe weakness despite significant weight gain)
- **Associations (D/D):**
  - ***Glands***
    - ○ *"Any progressive enlargement of body parts with increase in ring or hat size?"* ***(Acromegaly)***
    - ○ *"Do you have any intolerance to cold or preference to warm environment; constipation; any change in voice or hoarseness; dryness and roughening of skin; tingling, numbness of hands or feet; thyroid surgery, radiation to the neck; any difficult childbirth during the last 6 months; any excessive menstrual bleeding?"* ***(Hypothyroidism)***
    - ○ *"Do you have any skin changes like thinning, striae or bruising; hair growth/acne; difficulty in climbing stairs or standing up from a sitting position; irregular or missed menstrual periods, poor libido; hypertension, worsening diabetes; bony fractures?"* ***(Cushing's)***

Details of headache

- **Site:** *"Where exactly the pain is?"* (involving the whole head)
- **Onset:** *"Since how long you have the pain? ..... Is it constant or comes and goes? ...... Is it getting worse over time?"*
- **Character of pain:** *"What type of pain it is? ... Feeling of tight band around head, throbbing or excruciating?"* (more marked in the morning)
- **Radiation:** *"Does it move anywhere like back of head or neck?"*
- **Timings:** *" At what time of the day it is more marked? ...... Does it persist throughout the day?"*
- **Exacerbating/alleviating factors:** *"What makes it worse? ...... What makes it better? ... Any relief from painkillers?"*
- **Severity:** *"How bad is the pain on a scale of 1-10? ...... Does it wake you up from sleep?"*

Details of other complaints (change in voice, joint pain, excess sweating, visual disturbance)

- **Change in voice:** *"Since how long you noticed change in your voice? ... Is your voice getting hoarse?"*
- **Joint pains:** *"Which joints are painful? ... Do you have any joint swelling or only pain in the joints? ... Is it associated with any morning stiffness? ... What makes it worse and what makes you feel better?"* (joints involved include knees, ankles and elbows etc. The pain aggravates with activity and relieved by taking rest; no morning stiffness)
- **Excessive sweating:** *"Since how long you have noticed excessive sweating even at rest?"*
- **Visual disturbance:** *"Do you have any problem with your vision?"*

GENERAL EXAMINATION

As per findings

Face:

- Large coarse facial features

- Large scalp (bulldog scalp)
- Prominent supraorbital ridges, enlarged nose and lips
- Protrusion of lower jaw with malocclusion of teeth (prognathism)
- Enlarged tongue (macroglossia)
- Large jaw with widely apart teeth (splaying of teeth or interdental separation)
- Bitemporal hemianopia

Hands and feet:

- Skin is thick, greasy, and sweaty (hyperhidrosis)
- Large hands
- Broad sweaty palms with dough feeling
- Spade like fingers
- Large feet

Neck and axilla:

- Acanthosis nigricans
- Molluscum fibrosum (Large skin tags)

Others:

- Coarse body hair / hypertrichosis
- Gynecomastia
- Husky and cavernous voice
- Diffusely enlarged thyroid
- BP: 150/90 mm Hg

▶ SYSTEMIC EXAMINATION

CNS:

- Voice: hoarse, husky and cavernous
- Visual fields: bitemporal hemianopia

Abdomen:

- Hepatomegaly

CVS:

- Apex beat: displaced (cardiomegaly)

Musculoskeletal system

- Joints: knee, ankle, elbow, hands joints are tender without any restriction of movements

Examination of other systems

- No other abnormality detected.

"My diagnosis is acromegaly."

Differential diagnoses

- Hypothyroidism

DISCUSSION

▶ DEFINITIONS

Acromegaly

It results from excess GH secretion from the pituitary macroadenoma (>10 mm) after epiphyseal union causing generalized enlargement of the whole body.

Gigantism

It results from excess GH secretion from the pituitary macroadenoma (>10 mm) before epiphyseal union.
The term acral refers to periphery and megaly means big.

Both gigantism and acromegaly may overlap, if secretion of excess GH begins in adolescence and persists during adulthood.

▶ CAUSES

- **Macroadenoma**
- **Ectopic GHRH (**rare**):** from islet tumors, small cell carcinoma, medullary carcinoma of thyroid
  REMEMBER: microadenoma < 1 cm (<10 mm), macroadenoma > 1 cm (>10 mm)

▶ CLINICAL PRESENTATION

Face:

- ↑ Size of hat / shoes / ring
- Supra orbital ridge prominence
- Prognathism
- Macroglosia
- Splaying of teeth
- Bitemporal hemianopia (history of collision with doors, persons)
- Headache (common)
- Optic atrophy, papilledema, angioid streaks in retina

Arms:

- Spade like fingers / dough feeling
- Sweaty palms with thick skin

Neck / axilla

- Acanthosis nigricans
- Molluscum fibrosum

↑ GH / ↑ TSH

DM / HTN

Weight gain but weakness

Sleep apnoea syndrome

Signs of active acromegaly

- Excessive sweating
- Progressively increasing body size
- Progressively worsening headache
- Worsening visual field defect
- Enlarging thyroid
- Large skin tags (Molluscum fibrosum)
- DM, Hypertension

▶ INVESTIGATIONS

- **X rays:**

Skull	**Hands**	**Heel**
• Enlarged sella turcica • Double floor sella • Erosion of clinoid process • Prognathism • Enlarged skull, sinuses and mandible	• Terminal tufting of phalanges • Large soft tissues, bones, widening of joints	• Heel pad thickness > 25 mm (Normal Males: 21.5 mm; Females: 18 mm)

- **GH assay** (not useful)
  - Normal < 1 mU (↑ in stress)
- **OGTT with GH measurement** (Normally rise of glucose causes fall of GH and GH suppressed <2 mU)
  - Failure of suppression / paradoxical rise in 50% cases (> 4 mU highly suggestive of acromegaly)
- **IGF-1 ↑** (somatomedin C)
- **CT scan or MRI Pituitary fossa with gadolinium enhancement**

- **CT Scan abdomen**
- ↑ BSR (IGT in 25%, DM in 10%; ↑GH causes hyperglycemia due to IGF which inhibits insulin secretion)
- **Others:**
  - Comparison with old photographs
  - FSH, LH, TSH, Prolactin and ACTH measurement (other anterior pituitary hormones)
  - Perimetry (to work up bitemporal hemianopia)
  - ECG
  - Serum calcium (increased in MEN-I)

▶ TREATMENT

- **Surgery** (somatostatin analogue followed by surgery)
  - ***Trans-sphenoidal:***
    - Cure rate in microadenoma 80% and in macroadenoma 40%
    - GH and pituitary function tests done after 3 months postoperatively; if GH remains high adjuvant medical or radiotherapy
  - ***Trans-frontal:*** rarely used for large macroadenoma with suprasellar extension
- **Drugs:**
  - ***Somatostatin analogues (octreotide, lanreotide):*** every 2-4 weeks as a 1st line therapy
  - ***GH antagonist:*** Pegvisomant
  - ***Bromocriptine:*** used in high doses (dopamine agonist; less effective)

Aim of treatment:

- GH < 5 mU/L
- IGF-1 level normalisation
- Clinical improvement (↓body size, ↓sweating, improvement in glycaemic control /hypertension)

▶ MORTALITY CAUSES

- CAD, heart failure, hypertensive complications
- Diabetic complications
- Tumor expansion (mass effect)
- ↑ risk of malignancy, especially large bowel tumor
- Pituitary apoplexy: it is the rapid expansion of pituitary tumor from infarction or haemorrhage within the tumor causing sudden severe headache and unconsciousness; and requires immediate neurosurgical intervention.

Long term complications

- Increase incidence of large bowel carcinoma
- Increased risk of atherosclerosis

▶ HYPERPROLACTINEMIA

Causes

A. Physiological:

- severe stress, coitus, pregnancy, lactation, exercise, sleep

B. Drugs:

- ***Dopamine antagonist:***
  - Antiemetic: metoclopramide, domperidone
  - Antipsychotic: phenothiazine, butyrophenones
  - Antidepressant
- ***Dopamine depleting drugs:*** (methyldopa)
- ***Estrogen:*** OCPs

C. Pathological:

- Prolactinoma (pituitary microadenoma <10 mm), pituitary macroadenoma
- Primary hypothyroidism
- PCOS

- Renal / liver failure, hypothalamic tumor, post-ictal state
- Idiopathic

Clinical features

- Galactorrhoea, hypogonadism
- Males: decrease libido, impotence, lethargy
- Females: amenorrhea, oligomenorrhoea, menorrhagia, infertility

Investigations

- ***Serum prolactin:*** very high. Repeat to reconfirm
    - 500 - 1000 mU/L: drugs or stress
    - 1000 - 5000 mU/L: drugs, stress or microadenoma
    - >5000 mU/L: highly suggestive of macroprolactinoma
- CT scan & MRI brain
- Other investigations: according to the cause suspected (TFTs, RFTs)

Treatment

- ***Treatment the primary cause:*** stop the offending drug
- ***Dopamine agonist:*** (bromocriptine, cabergoline and quinagolide); first line therapy
- ***Trans-sphenoidal surgery:*** indicated under following circumstances
    - Large cystic macroadenoma
    - Drug intolerance or non-responder
    - Mass effects like visual field defects from rapid tumor expansion
- ***Radiotherapy:*** if no response to medical therapy or surgery is not feasible
- ***Treatment during pregnancy:*** enlargement of tumor size may cause headache and visual field defects that may require dopamine agonist therapy.

▶ CAUSES OF PROMINENT SUPRAORBITAL RIDGE

- Hereditary haemolytic anaemia
- Rickets
- Paget's disease
- Achondroplasia
- Hydrocephalus

▶ CAUSES OF MACROGLOSSIA

- Acromegaly
- Amyloidosis
- Hypothyroidism
- Down's syndrome

▶ CAUSES OF BAGGY EYELIDS

- Old age
- Myxoedema
- Nephrotic syndrome or acute GN
- Acromegaly
- Alcoholism

6. Diabetes Mellitus

▶ HISTORY (CHIEF COMPLAINTS)

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Associations (D/D):**
  - ***Non-gastrointestinal:***
    - ***Diabetes mellitus:*** *"Any increased frequency of water works or increased thirst?" (associated with extreme weakness and excessive thirst with plenty of water intake every day)*
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood?"*
    - ***Intentional:*** *"Any dieting?" (Dieting/diet pills, exercise, laxatives/diuretics, amphetamines, orlistat, fenfluramine, and thyroxine)*
    - ***Anxiety neurosis / depression:*** *"Any stress at job, home or marital conflict?"*
  - ***Gastrointestinal:***
    - *"Is there any change in your appetite?" (Weight loss despite good appetite)*
    - ***Malabsorption syndromes (coeliac disease, Crohn's disease):*** *"Any bulky, foul smelling and difficult to flush away bowel works, any diarrhoea?"*
    - ***Primary neoplasm:*** *"Any difficultly in swallowing, tummy pain, nausea / vomiting, any blood in vomiting or bowel works, any altered bowel habit?"*

Details of polyuria and increased thirst

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:**
  - *"How often you pass the water? ... Are you passing large volumes? ... Do you have to wake up at night to pass it? ... What is its colour? ... Do you have any difficulty in starting micturition (hesitancy)?"*
  - *"Do you have increased thirst as well? ... How much fluid you take in a day? ... And what type of fluids you take ... Like tea?"*
- **Associations (D/D):**
  - **DM**
  - **Diabetes insipidus:**
    - ***Cranial:*** *"Do you have any visual problems?* ***(Visual field defects)*** *...... Any cold intolerance or preference for warm environment, any weight gain with reduced appetite?* ***(Hypothyroidism)*** *...... Any sexual or menstrual problems?* ***(Hypogonadism)*** *...... Any milky nipple discharge?* ***(Galactorrhoea)*** *...... Any dizziness on standing from sitting position, weakness?* ***(Hypoadrenalism)*** *...... Any heartburn?"* ***(MEN 1)***
      - CNS tumours: primary brain tumours including hypothalamus & pituitary; metastases
      - Infections: TB, meningitis, cerebral abscess
      - Infiltrations: neurosarcoidosis with pituitary involvement, Langerhans cell histiocytosis, hemochromatosis
      - Head trauma, neurosurgery
      - Post-radiotherapy
      - Haemorrhage or thrombosis, aneurysm
    - ***Nephrogenic:***
      - Hypercalcaemia: Bones, stones, thrones, abdominal groans, psychic moans

        - Hypokalaemia
        - Lithium
        - Familial
        - Renal tubular acidosis
    - **Psychogenic polydipsia (compulsive water drinking):** psychiatric history
    - **Diuretics**
    - ***Metabolic:*** hypercalcaemia, diuretics, lithium

Details of burning sensation in hands and feet

- *"Can you please tell me where exactly the problem is? ... Which part of your hand or fingers? ... Up to which level? ..... Is it in one hand or both? ... Which hand had the symptoms first? ... Or you left or right-handed?"*
- *"Do you have any other problems with your hands like weakness, wasting or clumsiness/tremors?"*
- *"Do you have such symptoms in your feet as well?"*

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes it better?"*
- **Associations (D/D):**
    - **Peripheral neuropathy**
        - DM
        - Alcohol, dietary deficiencies of vitamin B1, B6 and B12
        - Drugs: isoniazid, nitrofurantoin
        - RA
        - Renal failure
        - Malignancy
        - Thyrotoxicosis
        - HMSN: family history
        - Idiopathic

Details of other complaints

- *"Any progressive visual deterioration?"* ***(retinopathy)***
- *"Any generalized swelling of body or legs?"* ***(nephropathy)***
- *"Any loss of consciousness?"* ***(Diabetic ketoacidosis, hypoglycaemia)***
- *"Any exertional chest pain?"* ***(IHD)***
- *"Any dizziness or giddiness?"* ***(Postural hypotension due to autonomic dysfunction)***
- *"Any skin problem?" (dermopathy, infection)*

Drug and treatment history:

▶ GENERAL EXAMINATION

As per findings

- look for height, weight and BMI

▶ SYSTEMIC EXAMINATION

CNS

- **Higher psychic functions:** Intact
- **Cranial nerves:** Intact
- **Motor system:**
    - ***Muscle tone:*** reduced in the lower limbs
    - ***Muscle power:*** Power grade 3/ 5 in the lower limbs

  - ***Muscles wasting:*** all the groups of muscle appear wasted in the feet, legs and thighs
  - ***Reflexes:***

Jerks	Biceps	Triceps	Supinator	Knee	Ankle	Plantar
Right	Diminished	Diminished	Diminished	Diminished	Absent	Equivocal
Left	Diminished	Diminished	Diminished	Diminished	Absent	Equivocal

  - ***Superficial reflexes (abdominal reflex):*** absent
  - ***Co-ordination:*** impaired in the lower limbs
  - ***Romberg's sign:*** positive
  - ***Tandem gait:*** normal
  - ***Involuntary movement:*** absent
- **Sensory system:**
  - ***Superficial sensation (pain, touch, temperature):*** diminished in the hands and feet up to mid legs (glove and stocking distribution)
  - ***Deep sensation (vibration, position sense):*** absent in both the lower limbs
- **Cerebellar signs:** absent
- **Autonomic function:** Normal, as evidenced by normal pulse, no postural hypotension
- **Fundoscopy:** Few dot and blot haemorrhages in the 9 o'clock position, 2-disc diameter away from the optic disc in the right eye. Few dot haemorrhages in 3 o'clock position, 1-disc diameter away from the optic disc.

Examination of other systems

- No abnormalities

"My diagnosis is diabetes mellitus with peripheral neuropathy with diabetic retinopathy."

DISCUSSION

▶ INVESTIGATIONS

- Blood sugar (fasting and 2 hours after breakfast)
- HbA1c
- Serum lipid profile (fasting)
- Urine RE & 24 hours urine for protein / creatinine clearance
- RFTs
- CBC
- ECG
- CXR
- USG abdomen
- Abdominal X-ray to see pancreatic calcification

▶ DIAGNOSTIC CRITERIA

- BSF (venous) > 7.0 mmol/L **or** BS 2-hour postprandial >11.1 mmol/L)
- BSR >11.1 mmol/L
- During OGTT > 11.1 mmol/L 2-hour after 75 g glucose.

In symptomatic patient, one abnormal finding is diagnostic of diabetes mellitus; in asymptomatic patients, 2 values are required.

Note:

  - Random means without regard to time since the last meal
  - Fasting means no calorie intake for 8 hours at least (not more than 16 hours)
  - BSF < 5.6 mmol/L is normal
  - For OGTT, only fasting glucose and 2 hours after 75 glucose is sufficient for diagnosis

- Perform OGTT only in borderline cases (BSF 6.1 - 7.0 mmol/L or BSR 7.8 - 11.0 mmol/L) and also for the diagnosis of gestational diabetes mellitus.

Impaired glucose tolerance (IGT) & Impaired fasting glucose (IFG)

Patients with IGT and/or IFG are now regarded as prediabetes.

Impaired glucose tolerance (IGT)

- BSF < 7 mmol, but during OGTT, 2 hours after the glucose load is 7.8 - 11.0 mmol.
- Increased risk of developing frank DM type 2 and macrovascular complications (mainly cardiovascular).
- Lifestyle modification for type 2 DM and annual blood sugar check-up. Treat cardiovascular risk factors aggressively.

Impaired fasting glucose (IFG)

- BSF between 6.1 to 6.9 mmol/L (110 to 125 mg/dL) according to WHO. However, ADA defines it as fasting glucose level between 5.6 to 6.9 mmol/L (100 to 125 mg/dL). These patients are prone to develop frank diabetes mellitus and cardiovascular disease. The patient is advised for weight reduction about 5 to 10% of their body weight, regular exercise and follow up. Usually no drug therapy is recommended.

▶ TYPES

Classification

A. ***Type 1 DM:***
  - Idiopathic
  - Immune mediated

B. ***Type 2 DM***

C. ***Gestational DM***

D. ***Other specific types:***
  - ***Endocrine causes:*** Acromegaly, Cushing's syndrome, glucagonoma, thyrotoxicosis
  - ***Pancreatic diseases:*** Chronic pancreatitis, hemochromatosis
  - ***Drug induced:*** corticosteroids
  - ***Genetic defects of B cell function***
  - ***Genetic defects of insulin action***
  - ***Genetic syndromes:*** Down's syndrome, Klinefelter's' syndrome, Turner's syndrome and DIDMOAD syndrome
  - ***Viral infections:*** congenital rubella, mumps and Coxsackie virus B

Latent diabetes

- Usually blood glucose is normal but may be high under certain conditions like pregnancy, infection, obesity, stress or drugs like steroid and thiazide diuretics

Potential diabetes

- Usually blood sugar usually is normal but there is increased future risk of developing diabetes mellitus due to genetic reasons like:
  - Diabetes in both parents
  - One parent is diabetic and the other has family history of diabetes
  - Diabetic sibling
  - If twins, the other one is diabetic

Brittle diabetes (unstable diabetes or labile diabetes)

- Uncontrolled DM with recurrent large swings in blood sugar levels often without any apparent reason; leading to irregular and unpredictable hyperglycaemia, frequent diabetic ketoacidosis, serious hypoglycaemia.
- Occurs in 1 - 2% of diabetics; usually in type 1 DM at young age (15 - 30 years); but in the elderly can occur in both type 1 and type 2 DM.
- Causes include total pancreatectomy, gastrointestinal absorption problems like delayed gastric emptying (gastroparesis), drug interactions, problem with insulin absorption.

Gestational DM (GDM)

- It is any degree of glucose intolerance that is first recognized during pregnancy. Future risk of developing DM is >50% in the next 20 years (mostly type 2).

Screening test:

- OGTT with 75g glucose is done between 24 and 28 weeks of gestation. GDM is diagnosed if blood glucose is:
  - Fasting > 5.1 mmol/L (91.8 mg/dL)
  - At 1 hour 10 mmol/L (180 mg/dL)
  - At 2 hour 8.5 mmol/L (153 mg/dL)

Foetal Complications:

- Teratogenicity: DM in first 6 weeks of pregnancy may cause cardiac, renal and skeletal malformations; characteristically caudal regression syndrome and neural tube defect.
- Fetal macrosomia: Caused by DM in later pregnancy (birth weight >90 percentile for gestational age). Persistent maternal hyperglycaemia leads to fetal hyperglycaemia and prolonged fetal hyperinsulinism, that stimulates excessive somatic growth mediated by insulin like growth factors (IGFs). Macrosomia affects all organs except the brain.
- Neonatal hypoglycaemia: maternal glucose crosses the placenta, but insulin cannot. As a result, fetal islet cells secrete excess insulin, which may cause neonatal hypoglycaemia
- Increased risk of polycythemia, hyperbilirubinemia and hypocalcaemia
- Hyaline membrane disease

▶ COMPLICATIONS

A. Acute complications:

- Hypoglycaemia
- Diabetic ketoacidosis
- Hyperosmolar nonketotic diabetic coma
- Lactic acidosis
- Infections: boils, carbuncle, abscess, cellulitis, tuberculosis

B. Long-term complications:

- *Microvascular*
  - **Eye:** retinopathy, cataract
  - **Neuropathy:** Peripheral neuropathy (sensory, motor or mixed), mononeuritis multiplex, mononeuropathy, autonomic neuropathy
  - Nephropathy
  - **Foot complications:** ulcers, gangrene, arthropathy
- *Macrovascular*
  - **Coronary circulation:** myocardial ischemia, infarction
  - **Cerebral circulation:** TIA, CVD
  - **Peripheral circulation:** ischemia, claudication
  - **Foot complications:** ulcers, gangrene, arthropathy

Foot complications are due to both macro and micro vascular lesions.

C. Cause of sudden death

- **Autonomic neuropathy:** It causes sudden cardiorespiratory arrest

Dawn and Somogyi phenomenon or effect

Dawn phenomenon

- Pre-breakfast hyperglycaemia in the diabetic patient (mainly type 1) due to insufficient insulin dosage at night; managed by increasing insulin dose at night and advising the patient to avoid taking carbohydrate at bedtime.

Somogyi phenomenon

- Pre-breakfast hyperglycaemia caused by increased release of counter regulatory hormones as a result of nocturnal hypoglycaemia (which often goes unrecognized) due to higher than the required dose of insulin during the previous night. It is commonly observed in children and managed by by decreasing the overnight insulin dose.

An early morning (3 am) and morning (fasting) blood sugar level is measured to differentiate between dawn and Somogyi phenomenon. In dawn phenomenon, there is hyperglycaemia at both time. In Somogyi phenomenon (3 am) blood sample shows hypoglycaemia and the morning fasting blood level shows hyperglycaemia.

▶ DIABETIC RETINOPATHY

Type 1 & type 2 diabetics are offered annual retinal screening under the NHS Diabetic Retinopathy screening program. Those patients with diabetic retinopathy are followed up more frequently via the ophthalmology services.

Immediate ophthalmology referral:

- Proliferate retinopathy (40% risk of blindness within 2 years if untreated)
- Rubeosis iridis (neovascular tufts of capillaries at pupillary margins)
    - Fluorescein angiography of retina to assess extent of retinal ischaemia
    - USG

  Treatment: pan-retinal photocoagulation to reduce viable retina
- Vitreous haemorrhage
- Advanced retinopathy with fibrosis and retinal detachment.

Referral within 6 weeks

- Pre-proliferative retinopathy
- Maculopathy
- Deterioration >2 Snellen chart line

Causes of loss of vision in DM

- Diabetic retinopathy
- Cataract
- Age-related macular degeneration
- Retinal vein occlusion
- Retinal artery occlusion
- Nonarteritic ischemic optic neuropathy
- Glaucoma

▶ DIABETIC NEUROPATHY

Types

- Sensory neuropathy (common)
- Mixed motor and sensory neuropathy
- Asymmetrical motor neuropathy (diabetic amyotrophy)
- Autonomic neuropathy
- Mononeuropathy
- Mononeuritis multiplex

Pathophysiology:

- Axonal degeneration
- Patchy or segmental demyelination
- Intraneural capillaries involvement

DPN

Treatment

- Duloxetine (1st line)
- Amitriptyline 10-75 mg (2nd line)

  (Both above are contraindicated in glaucoma)
- Pregabalin or Gabapentin (2nd or 3rd line mono therapy or in combination)

  (Pregabalin preferred over gabapentin in renal failure)

Diabetic amyotrophy

Clinical symptoms include severe pain and tenderness in the anterior aspect of thigh with associated asymmetrical wasting and weakness causing inability to get out of bed with reduction of muscle power, tone and loss of knee jerk. There is often little sensory loss. The underlying pathology is related to acute infarction of lower motor neurons of femoral nerve, lumbosacral plexus or lumbar roots.

Partial or complete resolution occurs with control of hyperglycaemia in 3-4 months (50% achieve complete recovery)

Treatment

Usually recovers but may take months to 2 years

- Good glycemic control
- Intensive insulin therapy
- Pain relief: amitriptyline, imipramine or carbamazepine. Aldose reductase inhibitor may help.

Autonomic neuropathy

CVS:

- ***Postural hypotension***
    - **Treatment**
        - Bed-head elevation
        - Elastic stockings
        - Fludrocortisone 50 -400 microgram/day
- ***Fixed heart rate, resting tachycardia***
- ***Sudden death***

Sudomotor:

- Hyperhidrosis of upper extremities and anhidrosis of lower extremities (anhidrosis of feet causes cracked skin and ulcer), gustatory sweating, nocturnal sweating without hypoglycaemia.

Vasomotor:

- Cold feet resulting from loss of vasomotor response, dependent edema due to loss of vasomotor tone and increased vascular permeability.

GIT:

- ***Gastroparesis***
    - **Investigations:** isotope gastric emptying/motility scan (using solid-phase meals)
    - **Treatment**:
        - Gastric prokinetic drugs: domperidone, metoclopramide
        - Small frequent meals
        - Low fat and low-fibre diet to minimise bezoar formation
        - Gastric pacemaker: promising results
- ***Nocturnal diarrhea***
- ***Constipation***

Genitourinary:

- Erectile dysfunction, urinary incontinence, difficulty in micturition and retrograde ejaculation

Hypoglycaemic unawareness:

- Inability to sense hypoglycaemia appropriately due to reduced counter-regulatory hormone release resulting from autonomic neuropathy.

Pupillary:

- Reduced pupil size, resistance to mydriatic and delayed or no reflex to light (called pseudo-Argyll Robertson pupil)

▶ DIABETIC FOOT

Types of ulcers in DM

- ***Ischemic ulcer:*** found on the dorsal surfaces or edges of the feet. Feet are cold, pulseless and hairless, and the nails are in poor condition.
    - **Causes:**
        - Microangiopathy
        - Atherosclerosis of large and medium size vessels

- ***Neuropathic ulcers:*** commonly found on the pressure points of the feet, painless with callus forming the edge and a clean base. 10% have absent dorsalis pedis pulses but it does not indicate ischaemia.
  - **Causes:**
    - DM
    - Syringomyelia
    - Tabes dorsalis
    - Leprosy
    - Polyneuropathy (due to any cause)
    - Progressive sensory neuropathy
- ***Combined ischemic and neuropathic ulcers***
- ***Infected ulcers:*** Infected ulcers are malodorous and often exude pus

If the ulcer is painful, the cause is vasculitis and if it is painless, the cause is neuropathy.

Care of feet in DM

- ***Preventive advice***
  - Feet inspection daily
  - Feet washing daily
  - Moisturising skin if dry
  - Changing socks or stockings daily
  - Cutting or filing toenails regularly
  - Avoid walking barefoot
  - Check footwear for foreign bodies
  - Wear suitable, well-fitting shoes
  - Cover minor cuts with sterile dressings
  - Do not burst blisters
  - Avoiding over-the-counter corn / callus remedies
  - Do not attempt corn removal
  - Avoid high and low temperatures
  - Regular and effective podiatry by podiatrist
  - Specially manufactured and fitted orthotic footwear to prevent recurrence of ulceration and to protect the feet of patients with Charcot neuroarthropathy.

Differences between ischemic ulcer and neuropathic ulcer

Features	Neuropathic ulcer	Ischemic ulcer (arterial)
Area	Warm, dry and pink	Cold, shiny, atrophic and loss of hair
Pulse	Bounding	Absent or reduced
Sensation	Reduced or absent	Normal
Ulcer	Painless and mostly plantar	Painful, over heels and toes
Reflex	Reduced or absent, equivocal plantar	Normal

Treatment

- Good glycaemic control
- Local dressing
- Antibiotic for infection control
- Avoid weight bearing
- Avoid bare foot, tight shoes and smoking
- Chiropodist consult
- Amputation or angioplasty

▶ DIABETIC CHEIRATROPATHY

- Occurs in 50% of type 1 diabetics and approximately 3/4th of type 2 diabetics

Clinical Features:

- Thickening of the skin resulting in contracture of the fingers with limited joint mobility and inability to extend the fingers to flatten the hand fully typically affecting both the hands.

Treatment:

- Tight glycaemic control
- Pain relief and / or anti-inflammatory drugs
- Physiotherapy

▶ HYPERGLYCAEMIC HYPEROSMOLAR NONKETOTIC COMA (HONK)

It refers to very high blood sugar levels (>50 mmol/L) and high plasma osmolality without ketosis due to partial insulin deficiency, which is sufficient to inhibit hepatic ketogenesis, but insufficient to control hyperglycaemia. There may be mild hyperchloremic metabolic acidosis and serum sodium is high (may be false low due to pseudohyponatremia). It may be the first presentation of DM in elderly with Type 2 DM.
Mortality rate is up to 40%.

Precipitating factors:

- High glucose diet intake
- Medications like thiazide or steroids
- Acute myocardial infarction
- Intercurrent illness

Treatment:

- **IV fluids:**
  - Give 0.45% saline (1/2 strength) switching to 0.9% normal saline when osmolality is normal (use 0.9% saline if hypovolemia as evidenced by hypotension and oliguria). Usually 4 - 6 liters fluid may be required in first 8-10 hours.
  - Switch to 5% dextrose water or dextrose 0.45% saline or dextrose 0.9% saline when blood sugar is 250 mg/dL. Adjust rate of glucose infusion to maintain blood sugar level between 250 - 300 mg/dL to reduce the risk of cerebral edema. IV fluids may be stopped when the urinary output is 50 ml/ hour or more.
- **Insulin:** Start soluble regular insulin IVI (preferably with insulin pump, 2 - 6 units/ hour) and adjust dose to reduce glucose level by 50 - 70 mg/dL/hour.
- **General measures:** NG feeding, catheterisation, antibiotics, electrolytes correction, low dose heparin to prevent VTE.

▶ DIFFERENCES BETWEEN DIABETIC KETOACIDOSIS (DKA) AND HONK

Points	DKA	HNDC
Age	Young but may be any age	>40 years
Pathophysiology	Insulin deficiency (common in type 1)	Partial insulin deficiency (common in type 2)
Breath	Smells like acetone	Don't smell like acetone
Kussmaul's breathing	Present	Absent
PH	6.8 - 7.3	> 7.3
Bicarbonate	Low	Normal
Ketonuria	Present	Absent
Osmolality	Normal	High
Blood sugar	High	Very high
Sodium	Low	High
Mortality	5 - 10%	30 - 40%

DIFFERENCES BETWEEN DIABETIC KETOACIDOSIS AND LACTIC ACIDOSIS

Points	DKA	Lactic acidosis
Precipitating factors	Insulin deficiency, infection	Biguanide
Dehydration	Present	Absent
Breath	Smells like acetone	Don't smell like acetone
Ketonuria	Present	Absent or mild
Serum lactate	Normal	Raised >5 mmol/L
Mortality	5 - 10%	>50%

METABOLIC ACIDOSIS

Causes of metabolic acidosis with normal anion gap

- RTA
- Diarrhoea
- Ureterosigmoidostomy
- Acetazolamide therapy
- Ammonium chloride ingestion

Causes of metabolic acidosis with high anion gap

- DKA
- Lactic acidosis
- Renal failure
- Salicylate poisoning

Anion gap = (Na + K) - (Cl + HCO3) in mmol/L (Normal 8 - 14 mmol/L)

Osmolality = 2 (Na + K) + blood glucose + serum urea (all in mmol/L) (Normal osmolarity 285 - 300 mOsm/kg)

Consciousness is depressed if serum osmolarity is > 340 mOsm.

INSULIN RESISTANCE SYNDROME OR METABOLIC SYNDROME OR SYNDROME X

It refers to combination of central obesity, type 2 DM, hypertension and dyslipidaemia (elevated LDL and triglyceride, low HDL) due to insulin resistance. Other features include elevated fibrinogen and uric acid.

CAUSES OF PAINLESS MYOCARDIAL INFARCTION

- DM with autonomic neuropathy
- Elderly patient with dementia
- CVD

V. NEUROLOGY

1. CVA

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness of right side of the body

"Where exactly the weakness is? ..."

- *"Which part of the arm first became weak? ... Does it spread to the rest of the limb? ...... Do you have weakness in your shoulder with difficulty in raising your arms above your head like combing; or weakness in your hand with weak grip; or both?"*
- *"Which part of the right leg first became weak? ... Does it spread to the rest of the limb? ... Do you have weakness in you hip with difficulty in raising from chair; or weakness in your foot with difficulty in walking; or both?"* **(Proximal or distal or both)**
- *"Do you have weakness anywhere else?"*

- **Duration:** *"Since how long you have the weakness?"*
- **Onset:** *"Was the weakness sudden onset or gradual?"* (Sudden onset weakness)
- **Progression:** *"Is it gradually worsening?"* (the weakness started from upper limb then progressed to the lower limb with falling to the ground)
- **Severity:** *"How severe is the weakness? ... Do you have any disability as a result of the weakness? ...... Are you left- or right-handed?"* (not able to walk and move right half of the body)
- **Association (D/D):**
  - ***TIA / Stroke:***
    - *"Any headache, visual problem, difficulty in speaking or swallowing, loss of consciousness, any problem with the balance?"*
    - *"Any neck pain?" (carotid artery dissection)*

    Look for cause of stroke like AF, blood clots in blood channels of legs, IE, LVF,
  - ***MS***
  - ***Migraine***
  - ***Epilepsy:*** Todd's paresis
  - ***SOL Brain***
  - ***Hysterical***

Details of difficulty in swallowing

"Can you please tell me what exactly the problem is?"

- *"Do you have a difficulty in initiating swallowing with coughing, choking or nasal regurgitation? ...... Is it more marked for liquids or solids?"* (more marked for solids) **(Neurological disorder)**

- **Duration:** *"Since how long you have difficulty in swallowing?"*
- **Progression:** *"Is it getting worse?"*

Details of difficulty in speech

- **Duration:** *"Since how long you have difficulty in speaking?"*
- **Progression:** *"Is it getting worse?"*

Details of urinary incontinence

- **Duration:** *"Since how long you have urinary incontinence?"*
- **Progression:** *"Is it getting worse?"*

Details of risk factors

- DM
- HTN
- IHD
- Smoking
- Blood fat levels (Hypercholesterolaemia)

- Family history of stroke

Details of daily chores of life:

- *"Would you like to tell me about your house where you live? ... Are there any stairs? ... What about the toilet and kitchen facilities? ... How you perform your activities of daily living?"*

▶ ENERAL EXAMINATION

As per findings

- BP: _____ mmHg
- Pulse: _____ beats /min (regular or irregularly irregular)
- Carotid bruit: present or absent on auscultation
- Patient is catheterized.

▶ SYSTEMIC EXAMINATION

CNS:

Higher mental functions:

- Conscious and oriented in time, place and person but unable to speak fluently and have slurred speech.

Cranial nerves:

- VII CN weakness on right side (UMN type)
- Other cranial nerves: NAD

Motor system:

- **Muscle tone:** ↑ in the right upper and lower limbs
- **Muscle power:** grade 3/5 in the right upper limb and 4/5 in the right lower limb.
- **DTR:**

Jerks	Biceps	Triceps	Supinator	Knee	Ankle	Plantar
Right	Brisk	Brisk	Brisk	Brisk	Brisk	Extensor
Left	Normal	Normal	Normal	Normal	Normal	Flexor

- **Clonus:** ankle and patellar clonus on the right side +
- **Coordination:** could not be performed on right side due to weakness
- **Gait:** hemiplegic gait (the weaker side strikes the ground while walking and to prevent it the affected lef is swung outwards at the hip, this is called circumduction)

Involuntary movements:

- *Not present*

Sensory system:

- Intact

Fundoscopy:

- Normal

Heart:

- no murmur heard on auscultation

Examination of other systems

- No abnormalities

"My diagnosis is hypertension with DM with CVD with right sided hemiplegia."

DISCUSSION

▶ TYPES OF STROKE

- **Transient ischaemic attack (TIA)**: Focal neurological deficit (FND), caused by cerebral ischemia, lasting <24 hours with complete recovery within 24 hours
- **Stroke in evolution**: FND worsening gradually over hours or days that persists >24 hours.
- **Completed stroke**: FND which have evolved fully and are persistent >24 hours.

- **Reversible ischemic neurological deficit (RIND):** FND lasting >24 hours but recover totally within 3 weeks.
- **Partial non-progressive stroke (PNS):** FND persisting for >3 weeks but are either partial or with minimal residual deficit.

▶ DIFFERENT TYPES OF CVD

Ischemic stroke due to cerebral thrombosis:

- ***Age:*** middle aged
- ***Onset:*** slow onset with stepwise progression; occurs during sleep or soon after waking
- ***Features:*** no history of vomiting and unconsciousness but there may be headache and convulsions.
- ***Prognosis:*** good
- ***Site of lesion:*** commonest vessel MCA and commonest site internal capsule
- Carotid bruit ±

Ischemic stroke due to cerebral embolism:

- ***Age:*** young
- ***Onset:*** very acute (stormy) onset within seconds to minutes; occurs during exertion or activity without warning sign of TIA)
- ***Site of lesion:*** Left MCA lesion is common (because left common carotid artery originates directly from aorta)
- ***Features:*** associated vasospasm exacerbate focal neurology. Dislodgement of thrombus may attenuate or abolish focal neurology. There may be shifting hemiplegia.
- ***Prognosis:*** good
- ***Cause:*** mitral stenosis with atrial fibrillation, paradoxical embolism through PFO, atherosclerosis, infective endocarditis, myocardial infarction.

Cerebral haemorrhage:

- ***Age:*** elderly
- ***Onset:*** sudden onset (seconds to minutes); occurs during excitement or exertion
- ***Features:*** vomiting, unconsciousness, convulsions
- ***Prognosis:*** Poor
- ***Site of lesion:*** lenticulostriate branch of MCA commonly involved; commonest site close to internal capsule in basal ganglia (Other sites cerebral white matter, thalamus, pons and cerebellum)
- ***Causes:*** accelerated hypertension, ruptured intracranial aneurysm, AVM, blood dyscrasia, haemorrhage within cerebral tumor
- On examination features of raised ICP, Cheyne-Stokes breathing, conjugate deviation of eyes, urinary retention. In pontine haemorrhage there is pinpoint pupil, pyrexia and paralysis (3P).

Subarachnoid haemorrhage:

- ***Age:*** Commonest in young.
- ***Causes:*** rupture of congenital berry aneurysm in 80% of cases (commonest sites posterior communicating artery, anterior communicating artery or middle cerebral artery); leakage from AVM; head injury; rupture of mycotic aneurysm in infective endocarditis/cerebral angioma; blood dyscrasias.
- ***Features:***
    - Sudden severe headache like thunderclap or struck by a hammer, followed by vomiting and unconsciousness
    - Features of meningism like neck rigidity and Kerning's sign; subhyaloid haemorrhage with upward concavity (boat shaped) on fundoscopy; III, IV and VI cranial nerves palsies or monoplegia or hemiplegia due to pressure effects of berry aneurysm or vascular spasm
- ***Investigations***
    - Lumbar puncture: raised CSF pressure; frankly haemorrhagic initially and xanthochromia later
    - CT scan & CT angiogram
- ***Treatment***
    - Control of hypertension, nimodipine, surgical treatment

Carotid hemiplegia:

- ***Age:*** middle aged or elderly hypertensives with atherosclerosis

  - ***Features:*** previous history of TIA or jaw claudication; ipsilateral visual disturbances (amaurosis fugax) and contralateral sensory motor deficit; carotid bruit at the site of narrowing, unequal pulse volume in both carotids

▶ CLINICAL FEATURES DEPENDING ON THE SITE OF LESION:

Cortical:

- Speech disturbance if lesion is in the dominant hemisphere
- Contralateral monoplegia or hemiplegia (if large lesion)
- Cortical type of sensory loss, e.g. astereognosis
- Jacksonian seizures

Subcortical:

- Speech disturbance if lesion is in the dominant hemisphere
- Contralateral monoplegia or hemiplegia
- Postural instability, loss of tactile localisation and discrimination in the affected extremities due to thalamocortical fibres involvement.

Internal capsule:

- Global aphasia if lesion is left sided
- Homonymous hemianopia
- Contralateral hemiplegia
- Hemianesthesia
- Ipsilateral facial nerve palsy (UMN type)

Brainstem:

- Nausea, vomiting, vertigo, impaired balance
- Ptosis, Horner's syndrome, crossed hemiplegia, cerebellar signs, gaze paralysis
- Lesions involving pons: deep coma, hyperpyrexia, pinpoint pupils, decerebrate rigidity, absence of lateral gaze on head turning
- Lesions involving midbrain & medulla: unconsciousness, quadriplegia, decerebrate rigidity, Cheyne-Stokes breathing.

▶ RISK FACTORS

Ischemic stroke:

- **Modifiable**:
  - HTN / DM / dyslipidaemia
  - Heart disease (AF, IHD, cardiomyopathy)
  - Alcohol / smoking
  - Obesity
  - OCP, COX-2 inhibitors
  - Cocaine use
- **Non-modifiable:**
  - Age
  - Gender
  - Race / ethnicity
  - Family history

Haemorrhagic stroke:

  - Hypertension
  - Aneurysm, AVM
  - Intracerebral neoplasm, cavernous angioma, amyloid angiopathy
  - Anticoagulation / throbmophilic conditions
  - Drugs: cocaine, amphetamine

  - Vasculitis: SLE, PAN, isolated CNS vasculitis
  - Moyamoya disease

▶ INVESTIGATIONS

- CT scan/MRI Brain
- CBC with ESR
- BSR
- RFTs with serum electrolyte
- Serum lipid profile (fasting)
- CXR
- ECG
- To find the source of the thromboembolism or ICB:
  - Carotid Doppler USG
  - Echo: TTE or TOE
  - MRA / CTA Brain
  - Digital subtraction angiography (DSA) cerebral vessels (Gold standard for diagnosis of AVM/aneurysm)
- Tests according to the suspected cause:
  - Autoimmune profile: ANA, anti-dsDNA, anti-phospholipid Ab, anti-cardiolipin Ab, pANCA/ cANCA
  - Thrombophilia screening: protein C / S, antithrombin III, factor V Leiden
  - Homocystinuria screening: Serum and urinary homocysteine or methionine
  - Syphilis screening: VDRL & TPHA
  - Polycythemia Rubra Vera (PRV): Red cell mass

▶ MANAGEMENT

General measures:

- NG feeding
- Regular change of posture (2 hourly) to prevent bed sores
- Oral toilet and oropharyngeal suction
- Care of bowel and bladder (catheterization)
- Care of eyes (taping to close the affected eye, tears natural)
- Management of HTN, DM hyperlipidemia
- Dexamethasone or mannitol if cerebral edema

Management to improve quality of life and reduce morbidity:

- Speech therapy / physiotherapy
- Occupational therapy

Specific treatment (after CT scan brain):

- ***Cerebral infarct:***
  - Antiplatelets: Aspirin 75 mg PO daily for 3 weeks followed by clopidogrel 75 mg PO daily
  - Anticoagulant: Heparin followed by warfarin if atrial fibrillation
  - Cerebral vasodilators: Vinpocetine
- ***Cerebral hemorrhage:***
  - Neurosurgical intervention for massive haemorrhage
- ***Subarachnoid hemorrhage***
  - Nimodipine
  - Neurosurgical intervention

Management of hypertension in stroke:

- ***Known hypertensive:*** continue antihypertensive drugs if the BP is normal or high.
- ***Not a known hypertensive:***
  - Mildly or moderately high BP: observe and add anti-hypertensive agents if BP persistently remains high after 7 - 10 days.
  - Start antihypertensive drugs on presentation if

  - BP >220/110 mm Hg
  - Co-morbidity: MI, cardiac failure, TOD

PROGNOSIS

- ICB has higher mortality rate than embolic stroke. 1/3rd returns to independent life, 1/3rd becomes disabled needing institutionalized care.
- **Cerebral infarction:** immediate outcome is better but long-term prognosis rest on the extent of infarction.
- **ICB**: immediate outcome is not good but long-term prognosis is better due to resolution of the haematoma (10% die within first month, 25% die within first 2 years)

COMPLICATIONS

- Complications of raised ICP
- Hydrocephalus
- Convulsion
- Aspiration pneumonia, UTI
- Pressure sores
- DVT
- Pulmonary embolism
- Electrolyte imbalance
  Anxiety and depression
- Altered sleep wake cycle

STROKE IN YOUNG

Causes

- ***Cardiac***
  - AF, PFO, VSD, TOF, left atrial myxoma
- ***Hematological***
  - Deficiency of protein C & S, antithrombin III, factor V Leiden
  - Homocystinuria
  - Sickle cell anaemia, polycythemia rubra vera
- ***Autoimmune:*** SLE, APLAS
- ***Vasculitis:*** Behcet's disease
- ***Vascular malformation:*** berry aneurysm causing SAH, AVM
- ***Basilar migraine***
- ***Syphilis***
- ***Arterial dissection***
- ***OCP, eclampsia***
- ***Premature atherosclerosis in familial hyperlipidemia***
- ***Amphetamine, cocaine***

Investigations

- CBC & ESR, CXR, ECG and echocardiography
- Serum lipid profile
- Autoimmune profile: ANA, anti-dsDNA, anti-phospholipid Ab, anti-cardiolipin Ab, ANCA
- Throbmophilic screening: Protein C / S, antithrombin III, factor V Leiden
- Serum and urinary homocysteine or methionine levels
- Red cell mass (PRV)
- VDRL / TPHA

CAUSES OF STROKE

- **CVD:** AF
- **Haematological:** Hyperviscosity syndrome, polycythemia rubra vera

- **Throbmophilic disorders:** Deficiencies of protein C, S, antithrombin III, factor V Leiden; Homocystinuria
- **Autoimmune/connective tissue diseases:** APLAS, polyarteritis nodosa, Wegener's granulomatosis, Takayasu's arteritis
- **Misc. causes:** Multiple sclerosis, epilepsy (Todd's palsy), hemiplegic migraine, hysteric hemiplegia

▶ BRAINSTEM SYNDROME

Weber syndrome:

- Ipsilateral 3rd CN paralysis (LMN type) + crossed hemiplegia (contralateral hemiplegia) + upward gaze paralysis. Lesion is in midbrain.

Millard-Gubler syndrome:

- Ipsilateral 6th CN paralysis (LMN type) ± 7th CN palsy (LMN type) + crossed hemiplegia (contralateral hemiplegia). Lesion is in the pons.

Lateral medullary syndrome (PICA thrombosis, Wallenberg's syndrome):

- ***Ipsilateral:***
    - Loss of pain & temperature sensation over face (trigeminal nerve nucleus & descending tract involvement)
    - Diplopia (VIth CN involvement)
    - Palatal paralysis and diminished gag reflex (hoarseness and dysphagia due to vocal cord paralysis due to IX and X nerve lesion)
    - Cerebellar signs (involvement of cerebellum and its connection)
    - Horner's syndrome (involvement of descending sympathetic tract)
- ***Contralateral:***
    - Loss of pain and temperature sensation in the trunk and limbs also called dissociated sensory loss (involvement of spinothalamic tract)
- Isolated PICA occlusion does not involve pyramidal pathways so there is no hemiplegia. However, in majority of the cases, vertebral artery is involved which also involve pyramidal pathways and causes hemiplegia).

Medial medullary syndrome:

- ***Ipsilateral:***
    - Paralysis and wasting of tongue (XII CN paralysis)
- ***Contralateral:***
    - Hemiplegia sparing the face
    - Loss of vibration and joint position sense
- Caused by occlusion of lower basilar artery or vertebral artery or one of its medial branches.

Note

- Brainstem reticular activating system lesions causes coma
- Upper brainstem infarction (ventral pons) causes the locked-in syndrome
- Lower brainstem infarction (medullary infarction) causes pseudobulbar palsy

▶ FUNNY TURNS

Disturbance of consciousness which may be transient.

Causes

- Syncope / simple faints
- Severe vertigo
- TIA, basilar migraine, drop attacks
- Epilepsy
- Hydrocephalic attack
- Cardiac dysrhythmias
- Hypoglycaemia

- Hypocalcaemia
- Cataplexy, narcolepsy, sleep paralysis

▶ DROP ATTACK

- Falling without losing consciousness or any warning signs, or dizziness due to unpredictable sudden change in muscle tone of lower limbs resulting in transient weakness in lower limbs. It is thought to originate from brainstem. More common in women of middle age.

▶ COMA VIGIL

- State of impaired consciousness with muttering (muttering delirium) observed in fever due to infections like pneumonia, enteric, etc.

2. Spastic paraplegia (cord compression)

HISTORY (CHIEF COMPLAINTS)

Details of weakness lower limbs and difficulty in walking

"What actually the problem is?"

- *"Do you have weakness in one or both legs?"* **(One or both legs)**
- *"Do you have difficulty in walking up stairs and getting out of chair or weakness in the feet or global weakness?"* **(Proximal / Distal /Global weakness)**
- *"Are the legs stiff or floppy?"*
- *"Do you have weakness in any other part?"*
- *"Do you have any other problem with legs like numbness or tingling? ... Any problem with the balance?"*

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"Did it start abruptly or gradually?*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How severe is the weakness?"*
- **Aggravating / relieving factors:** *"What makes it worse? ... What makes you feel better?"*
- **Ever had it before:** *"Have you ever had it before?"*
- **Association (D/D):**
  - ***Spinal injury***
  - ***Respiratory, abdominal or gynecological neoplasm:***
    - *"Do you have any cough or chest pain? ... Any tummy pain or bowel problems? ... Any vaginal bleeding?"*
    - *"Do you have any backache or band-like chest pain worse on coughing, sneezing and straining?" (Suggest a level of spinal cord compression)*
  - ***Pott's disease:*** *"Do you have any swelling over the backbone or fever?"*
  - ***Hereditary spastic paraparesis:*** *"Any family history of leg weakness?"*
  - ***Myasthenia gravis:*** *"Is the weakness worse towards the end of the day?"*

Details of low back pain

- **Site of pain:** *"Where exactly the pain is? ... Can you point it? ...... Do you have pain in any other joint?"*
- **Onset:** *"Did it develop suddenly or gradually? ..... What were you doing at that time?"*
- **Character:** *"What type of pain it is? .... sharp, stabbing, burning, band-like heaviness or dull? ...... Is it a constant, pain or it comes and goes?"*
- **Radiation:** *"Does it move circumferentially along the ribs to the front or legs?"*
- **Timings/duration:** *"Since how long you have the pain?"*
- **Exacerbating & relieving factors:** *"What makes it better? ..... What makes it worse?"* (Worsens on movement and even with minor activity) ...... *How is the pain control with medicines?"*
- **Severity:** *"How bad it is on a scale of 1-10? ...... How badly it is affecting your life including work and sleep?"*

Details of inability to void urine

- **Duration:** *"Since how long you have difficulty in passing water works and urinary incontinence?"*
- **Onset:** *"Did it start abruptly or gradually?*
- **Progression:** *"Is it worsening with time?"*

Details of tingling and numbness of both lower limbs

- *"Can you please tell me where exactly the numbness is? ... Which part of your legs? ... Up to which level? ...... Do you have such symptoms in your hands as well?"*
- *"Do you have any other problems with your legs like weakness, wasting or clumsiness/tremors?"*

- **Duration:** *"Since how long you have the problem?"*

- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes it better?"*

▶ GENERAL EXAMINATION

- As per findings
- Urinary catheter in situ

▶ SYSTEMIC EXAMINATION

CNS:

Higher mental functions:

- Normal

Cranial nerves & fundoscopy:

- NAD

Motor system:

- **Tone:** normal in upper limbs but ↑ in both lower limbs
- **Power:** normal in upper limbs but grade 0/5 in both lower limbs
- **Muscles wasting** absent
- **DTR:**
  - Knee and ankle jerks in both lower limbs are exaggerated while plantars are extensors
- **Coordination:** normal in upper limbs; in the lower limbs, however, heel-shin test could not be performed due to weakness in the lower limbs
- **Romberg's and gait:** could not be evaluated due to weakness

Involuntary movements:

- absent

Cerebellar functions:

- Intact

Sensory system:

- All sensations are impaired below 10th thoracic dermatome but intact above it. There is some paraesthesia along the T10 dermatome.

Examination of other systems

- No other abnormalities detected.

"My diagnosis is spastic paraplegia, more likely due to cord compression."

Differential diagnoses

- **Cord compression**
- **Transverse Myelitis**
- **Herniated intervertebral disc:** only radicular pain without spastic paraplegia
- **Tumor**
- **Subacute combined degeneration (SCD):** Peripheral neuropathy, loss of dorsal column sensations (position and vibration sense), extensor plantars, absent ankle and knee jerks (knee jerks may be brisk), Romberg's sign +; no sphincteric disturbance; pallor, beefy smooth shiny tongue with atrophy of papilla; dementia.

In MND there are both upper and lower motor neuron signs (fasciculation) but no sensory loss, no pain, no sphincteric disturbance.

DISCUSSION

▶ INVESTIGATIONS

- X-ray LS spine AP & lateral view
- MRI dorsal spine (dorsal means thoracic)
- Lumbar puncture and CSF study

- Other test according to the suspected cause (like to exclude tuberculosis and myeloma)

▶ CLINICAL SIGNS OF CORD COMPRESSION

Signs:

- LMN signs at the level of compression + UMN signs (spastic paraplegia) below the level of compression
- Segmental sensory loss (sensory loss up to a particular segmental level)
- Other features:
    - Radicular pain: at the site of compression
    - Band-like radiation of pain around the chest (thoracic compression)
    - Sphincter disturbance (urinary retention and loss of bladder control)

▶ CLINICAL FINDINGS OF CORD COMPRESSION AT VARIOUS LEVELS

- ***Lesion above C5:*** Upper/lower limbs UMN lesion + sensory loss all four limbs
- ***Lesion at C5:*** Proximal muscles of upper limb (deltoid, rhomboid, biceps, brachioradialis) LMN lesion + loss of biceps reflex and exaggerated triceps jerk + segmental sensory loss C5 dermatome + rest of the upper limb / lower limb UMN signs
- ***Lesion at C8:*** Intrinsic muscles of the hand LMN signs & wasting + segmental sensory loss C8 dermatome + lower limbs UMN signs
- ***Lesion in thoracic cord:*** Spastic paraplegia + segmental sensory loss + Loss of upper abdominal reflexes at T7 and T8 /Loss of lower abdominal reflexes and upward displacement of the umbilicus at T10 and T11.
- ***Lesion at L1:*** Lower limbs UMN signs + loss of cremasteric reflex (but normal abdominal reflex)
- ***Lesion at L4:*** Quadriceps wasting & LMN signs + knee jerk lost, ankle jerk brisk, extensor plantar
- ***Lesion in L5 and S1:*** LMN weakness of knee flexion and hip extension (S1) and abduction (L5) and calf and foot muscles. Knee jerk is present, but no ankle jerk or plantar response. Anal reflex is present.
- ***Lesion in S3 and S4:*** No anal reflex, saddle sensory loss, normal lower limbs.

Remember:

- In spastic paraplegia due to spinal cord compression, there is definite upper limit of sensory loss.
- In SCD, there is extensor plantar response, absent ankle jerks, sensory loss in glove and stocking distribution, loss of vibration and position sense
- In spastic paraplegia if there are cerebellar signs, the diagnosis is either MS or Friedreich's ataxia
- In Friedreich's ataxia, the patient is young with pes cavus, dorsal column sensory loss and cerebellar signs.
- In MND, there is spastic paraplegia, but no sensory loss (amyotrophic lateral sclerosis, also LMN lesion in upper limb).

▶ SENSORY LEVEL IN SPINAL CORD COMPRESSION

Vertebral level	Spinal cord segment
Cervical vertebrae	Add 1
Upper thoracic vertebrae (T1 to T6)	Add 2
Mid thoracic vertebrae (T7 to T9)	Add 3
10th thoracic vertebra	Lumbar 1 & 2
11th thoracic vertebra	Lumbar 3 & 4
12th thoracic vertebra	Lumbar 5
First lumbar vertebra	Sacral and coccygeal cord segments

▶ CAUSES OF SPASTIC PARAPLEGIA

- **Spinal cord compression:** Trauma, TB (Pott's disease), tumour (meningioma, glioma, myeloma neurofibroma, leukemia, lymphoma)
- **Cervical myelopathy**
- **Transverse myelitis**
- **Subacute combined degeneration of cord (SCD)**

- **Friedrich's ataxia** (early age, < 25 years)
    - Absent knee and ankle jerks
    - Pyramidal signs: extensor plantar
    - Cerebellar signs
    - Dorsal column sensory loss (vibration and position sense)
    - Pes cavus / kyphosis
    - Optic atrophy, high arched palate, deafness and cardiomyopathy
- **Tabes dorsalis:** syphilis
- **Anterior spinal artery thrombosis**
- Tropical spastic paraplegia
- Hereditary spastic paraplegia
- MS, ADEM
- MND (middle aged or elderly): amyotrophic lateral sclerosis, primary lateral sclerosis
- HIV myelopathy

CAUSES OF CORD COMPRESSION DEPENDING ON SITE OF LESION

- **Vertebral lesion (extradural, 80%):**
    - Trauma, TB spine (Pott's disease), intervertebral disc prolapse, tumour (lymphoma, metastatic deposits/ multiple myeloma, paravertebral abscess, extramedullary haematopoiesis in β thalassemia major)
- **Meningeal lesion (intradural, extramedullary, 15%):**
    - Epidural abscess, secondary deposit (elderly), meningioma, neurofibroma, ependymoma, leukemia, lymphoma,
- **Spinal cord lesion (intradural, intramedullary, 5%):**
    - Syringomyelia, glioma, ependymoma, metastatic deposits
- **Cerebral lesion:**
    - Thrombosis of unpaired anterior cerebral artery
    - Thrombosis of superior longitudinal sinus
    - Parasagittal meningioma (usually falx meningioma)
    - Cerebral palsy in children (cerebral diplegia)

(Features of cerebral lesion causing paraplegia: headache, vomiting, convulsion, Jacksonian fit; cortical type of sensory loss; urinary retention)

PARAPLEGIA IN FLEXION VERSIS PARAPLEGIA IN EXTENSION

	Paraplegia in extension	**Paraplegia in flexion**
Etiology	Pyramidal lesion (partial transection of spinal cord)	Pyramidal and extrapyramidal lesion (complete transection of spinal cord)
Hypertonia	More in extensors (hip and knee extended, feet plantar flexed)	More in flexors (hips and knees flexed; feet dorsiflexed)
Lower limb position	Extended	Flexed
DTR	Brisk	Less brisk
Clonus	+	-
Mass reflex	-	±
Bladder	Precipitancy	Automatic bladder

Mass reflex

In severe spinal cord lesion, stimulation of skin over the lower limbs or lower abdomen causes reflex flexion of the lower limbs and lower trunk muscles; evacuation of the bowel, bladder and semen; and sweating, called mass reflex.

▶ CAUSES OF EXTENSOR PLANTAR RESPONSE WITH ABSENT ANKLE JERKS

- SACD
- Friedrich's ataxia
- Taboparesis
- DM with cervical myelopathy

▶ DIFFERENCE BETWEEN RIGIDITY AND SPASTICITY

- **Spasticity:** It is the increased resistance felt in the beginning of passive movement which lessens later. If the initial resistance is followed by sudden loss of resistance, it refers to clasp-knife type and caused by pyramidal lesions. Spasticity is felt better in anti-gravity muscles, while extending upper limbs and flexing lower limbs.
- **Rigidity:** It is the sustained resistance felt during entire passive movement and caused by extrapyramidal lesion. If the resistance is uniform, it refers to lead pipe rigidity (better seen in elbow and knee). If the resistance is interrupted by tremors, it refers to cog wheel rigidity (better seen in the wrist joint).

▶ CAUSES OF FLACCID PARAPLEGIA

With involvement of bowel/bladder:

- Cauda equina syndrome
- Spinal shock

Without involvement of bowel/bladder:

- GBS / AIDP
- Periodic paralysis (hyperkalaemia or hypokalaemia)
- Motor neuropathy due to any cause (AIP, CMTD, chronic lead poisoning, paraneoplastic syndrome)
- Progressive muscular atrophy (MND)
- UMN lesion in shock stage
- Hysterical conversion reaction

3. Flaccid paraparesis (GBS)

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness of both lower limbs

"What actually the problem is?"

- *"Do you have weakness in one or both legs?"* **(One or both legs)**
- *"Do you have difficulty in walking up stairs and getting out of chair or weakness in the feet or global weakness?"* **(Proximal / Distal /Global weakness)**
- *"Are the legs stiff or floppy?"* floppy
- *"Do you have weakness in any other part?"*
- *"Do you have any other problem with legs like numbness or tingling? ... Any problem with the balance?"*

- **Duration:** *"Since how long you have the weakness?"*
- **Onset:** *""How did it start? ... Did it start abruptly or gradually?"*
- **Progression:** *"Is it worsening with time?"* (Initially involved both feet but gradually increased for the last few days with sequential involvement of the legs and the thighs)
- **Severity:** *"How severe is the weakness?"* (initially difficulty in walking but now bedridden and unable to move limbs for the last few days ± difficulty in breathing but no swallowing difficulty or nasal regurgitation.
- **Aggravating / relieving factors:** *"What makes it worse? ... What make you feel better?"* (none)
- **Ever had it before:** *"Did you ever had it before?"* (No previous episode of such illness)
- **Association (D/D):**
  - GBS
  - AIP
  - Chronic lead poisoning
  - Diphtheria
  - CMTD

Details of other complaints

- *"Had you any fever with sore throat and cough; or loose bowel works; or any vaccination 1-3 weeks before you developed the weakness?"*

▶ GENERAL EXAMINATION

As per findings

▶ SYSTEMIC EXAMINATION

CNS

Cranial nerves including fundoscopy:

- NAD

Motor system:

- **Tone:** decreased in both lower limbs
- **Power:** grade 1/5 in lower limbs while normal in the upper limbs
- **Wasting:** Absent
- **DTR:** absent in lower limbs but normal in upper limbs
- **Plantars:** equivocal
- **Coordination:** Could not be elicited in the lower limbs due to weakness but normal in upper limbs
- **Romberg's and gait:** Could not be tested due to inability of patient to stand and walk

Involuntary movements:

- Absent

Sensory system:

- Intact

Examination of other systems

- No other abnormalities detected

"My diagnosis is flaccid paraplegia, more likely due to Guillain-Barré Syndrome."

Differential diagnosis

- Guillain-Barré syndrome (GBS)
- Motor neuropathy due to any cause
- Progressive muscular atrophy (MND)

DISCUSSION

▶ INVESTIGATIONS

- **CSF**: albuminocytological dissociation (↑albumin > 1 g/dL with normal or slightly ↑ lymphocytes <20/mm^3. During the initial 10 days, CSF proteins may be normal. Think about other causes, if lymphocytes > 50/mm^3.)
- **Spirometry/PEFR:** monitor FVC, FEV$_1$ or PEFR
- **ABGs**
- **NCS:** slow conduction or conduction block. Demyelinating neuropathy usually found after 1 week.
- **Serum potassium levels**
- Tests to identify CMV, mycoplasma or campylobacter

▶ PATHOGENESIS

Etiology

Develops 1 - 3 weeks after

- URTI
- Diarrhoeal illness caused by campylobacter (70% cases), CMV
- Others: mycoplasma, herpes zoster, HIV, EBV infection
- Post-vaccination or surgery occasionally

Pathophysiology

- ***Demyelinating:*** acute inflammatory demyelinating polyneuropathy (AIDP)
- ***Axonal:***
    - ***Motor:*** acute motor axonal neuropathy (AMAN)
    - ***Sensorimotor:*** acute motor and sensory axonal neuropathy (AMSAN)

▶ CLINICAL FEATURES

Clinical presentation

GBS does not recur (monophasic disease).

- **Ascending paralysis:** appearing 1-3 weeks after URTI or diarrhoeal illness resulting in quadriplegia
- **Respiratory paralysis** (20% cases)
- **Pain and paraesthesia in the back and limbs**
- **Bulbar and facial weakness**
- **Dysautonomia:** fluctuation in BP, tachycardia, increased sweating, dysrhythmia

Clinical findings

- Flaccid paralysis
- Absent deep tendon reflexes
- Facial nerve palsy (50% of cases have bilateral, 25% of cases have unilateral)

No or minimum sensory loss. Sphincter involvement is rare.

▶ VARIANTS OF GBS

Regional:

- **Miller Fisher:** ophthalmoplegia, ataxia and areflexia. Antibodies to ganglioside GQ1b may be found.

- **Pharyngeal-cervical-brachial (PCB) variant:** rapidly progressive oropharyngeal and cervicobrachial weakness associated with areflexia in the upper limbs.
- **Oculopharyngeal weakness**

Functional:

- **Acute inflammatory demyelinating polyneuropathy (AIDP)**
- **Acute motor axonal neuropathy (AMAN):** good recovery
- **Acute motor-sensory axonal neuropathy (AMSAN):** poor recovery
- **Pure sensory GBS:** rapid onset of sensory loss, sensory ataxia, areflexia
- **Acute panautonomic neuropathy:** severe postural hypotension, bowel/ bladder retention, anhidrosis, reduced salivation /lacrimation, pupillary abnormalities, dysrhythmias.

▶ TREATMENT

- ICU admission
- Respiratory function monitoring regularly (vital capacity and ABGs)
- **Mechanical ventilation**
  Indications: (for Impending respiratory failure)
    - Tachypnoea
    - FVC <1.5L (<20 mL/kg)
    - PaO_2 <10 kPa
    - $PaCO_2$ > 6 kPa
    - Maximum inspiratory pressure <30 cm H_2O, maximum expiratory pressure <40 cm H_2O
    - Bulbar dysfunction
    - Autonomic dysfunction
    - Bilateral facial palsy
    - Rapidly progressive disease
- **High dose IVIG:** reduces the duration and severity of GBS if given within 14 days. Dose 400 mg/kg/day for 5 days.
  - ***Indications:*** (Ideally should be given within 2 weeks of disease onset)
    - Rapid progressive disease
    - Oropharyngeal weakness
    - Incipient respiratory failure
    - Autonomic dysfunction
    - inability to walk
  - ***Side effects***
    - Renal failure
    - Proteinuria
    - Nephrotic syndrome
    - Aseptic meningitis
    - Stroke
    - MI
    - CCF
    - Anaphylaxis in congenital IgA deficiency
- **Plasma exchange / Plasmapheresis:** Plasma exchange is most commonly performed. Equally effective it is equally effective in reducing disease severity and duration of GBS, if given within 14 days.
  Plasmapheresis: removes a smaller amount of plasma, usually less than 15% of the patient's blood volume and therefore does not require replacement of the removed plasma. Plasma exchange is the procedure that is performed most commonly. A large volume of plasma is removed from a patient.
  - ***Adverse effects of plasmapheresis:***
    - Pneumothorax
    - Infection
    - Haemorrhage

  - Hypotension
  - Hypoprothrombinaemia
  - Cardiac arrhythmia
  - Electrolyte imbalance
- **Physiotherapy**
- **Prevention of pressure sore and venous thrombosis**

PROGNOSIS

- **Recovery** in 80% over 3-6 months but may take 6-18 months or longer if axonal injury.
- **Residual disability** in 10%
- **Death** in 3 -10%

Causes of death

- Respiratory failure
- Bulbar palsy (leading to aspiration pneumonia)
- Cardiac: arrhythmia, conduction block

Adverse prognostic factors:

- > 60 years of age
- Preceding Campylobacter jejuni infection
- Rapidly progression with maximum disability in 7 days)
- Bulbar weakness
- Early and prolonged mechanical ventilation
- Descending paralysis
- Asymmetrical weakness
- Autonomic dysfunction
- Evidence of widespread axonal damage
- Very high CSF proteins

Good prognostic factors:

- Young age
- Preceding respiratory infection
- Slow progression
- Ascending paralysis
- No respiratory muscle involvement
- Facial nerve involvement
- Symmetrical involvement
- Demyelinating disease
- Early treatment
- Early recovery

CAUSES OF MOTOR NEUROPATHY

- GBS
- AIP
- Chronic lead poisoning
- Diphtheria
- Diabetic amyotrophy
- CMTD
- Paraneoplastic syndrome

4. Motor neuron disease (MND)

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness and inability to walk

"What actually the problem is?"

- *"Do you have weakness in one or both legs?"* **(One or both legs)**
- *"Do you have difficulty in walking up stairs and getting out of chair or weakness in the feet or global weakness?"* ***(Proximal / Distal /Global weakness)*** **Generalised weakness in MND**
- *"Are the legs stiff or floppy?"* **(stiff legs in MND)**
- *"Do you have weakness in any other part?"*
- *"Do you have any other problem with legs like numbness or tingling? ... Any problem with the balance?"* **(No sensory loss in MND)**

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"How did it start? ... Did it start abruptly or gradually?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How severe is the weakness? ... Do you have any difficulty in walking without the help of others?"*
- **Aggravating / relieving factors:** *"What makes it worse? ... What make you feel better?"*
- **Ever had it before:** *"Have you ever had it before?"*
- ***Associations (D/D):*** *(Also ask other questions of CNS)*
  - ***Spinal injury***
  - ***Respiratory, abdominal or gynecological neoplasm:***
    - *"Do you have any cough or chest pain? ... Any tummy pain or bowel problems? ... Any vaginal bleeding?"*
    - *"Do you have any backache or band-like chest pain worse on coughing, sneezing and straining?" (Suggest a level of spinal cord compression)*
  - ***Pott's disease:*** *"Do you have any swelling over the backbone or fever?"*
  - ***Hereditary spastic paraparesis:*** *"Any family history of leg weakness?"*
  - ***Myasthenia gravis:*** *"Is the weakness worse towards the end of the day?"*

Details of weight loss and wasting of limbs

- **Duration:** *"The time during which you lost the weight and wasting of the limbs?"*
- **Onset:** *"How did it develop?"* (initially wasting developed in the lower limbs and then in the muscles of the hands and forearms associated with occasional spontaneous twitching movements and with muscle cramps)
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Associations (D/D):**
  - ***Non-gastrointestinal:***
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***Diabetes mellitus:*** *"Any increased frequency of water works or increased thirst?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood?"*
    - ***Adrenal insufficiency:*** *"Any weakness or dizziness?"*
  - ***Gastrointestinal:***
    - *"Is there any change in your appetite?"*
    - ***Primary neoplasm:*** *"Any difficultly in swallowing, tummy pain, nausea / vomiting, any blood in vomiting or bowel works, any altered bowel habit?"*

- ○ ***Malabsorption syndromes (coeliac disease, Crohn's disease):*** *"Any bulky, foul smelling and difficult to flush away bowel works, any diarrhoea?"*

▶ GENERAL EXAMINATION

As per findings

▶ SYSTEMIC EXAMINATION

CNS

Motor system:

- **Fasciculations:** present in both thighs and in upper limb muscles
- **Wasting:** there is wasting in all muscles of lower limbs, hands and forearm
- **Tone:** ↑ in both lower limbs but normal in the upper limbs
- **Power:** grade 4/5 in both lower limbs and grade 3/5 in the upper limbs. All the small muscles of hands are weak.
- **DTR:** depressed in upper limbs but exaggerated in both lower limbs
- **Clonus:** patellar and ankle clonus present
- **Plantars:** extensor plantar response
- **Coordination:** impaired because of weak muscles
- **Gait:** Spastic

Involuntary movements:

- Absent

Sensory system:

- Intact

Examination of other systems

- No abnormalities

"My diagnosis is motor neuron disease (MND) which appears to be amyotrophic lateral sclerosis."

Remember 'No's in MND:

- No dementia
- No ocular involvement
- No cerebellar or extrapyramidal lesion
- No sensory involvement
- No sphincter disturbance
- No loss of sensorium till death
- No CSF abnormality

Differential diagnosis (D/D)

- **Amyotrophic lateral sclerosis:** Amyotrophy refers to muscle atrophy and lateral sclerosis refers to lesion in lateral corticospinal tract. There is combined upper and lower motor neuron lesions (UMN lesion in the lower limbs and LMN lesion in the upper limbs)
  LMN signs: muscle wasting, fasciculation
  UMN signs: exaggerated reflex
  No sensory loss
- **Cervical cord compression at C5 and C6:** UMN lesion in lower limbs and LMN lesion in the upper limbs. MRI cervical spine is diagnostic.
- DM
- Paraneoplastic syndrome (bronchial carcinoma)
- Syringomyelia: dissociated sensory loss

▶ INVESTIGATIONS

Diagnosis is based on clinical assessment and investigations are required only for exclusion of other causes.

- X-ray cervical spine

- CT / MRI brain & spinal cord: normal
- NCS: normal motor & sensory conduction
- EMG: for confirmation of denervation and fasciculations
- BSR: for exclusion of diabetic amyotrophy
- VDRL or TPHA: for exclusion of neurosyphilis
- CXR: for exclusion of bronchial carcinoma
- USG abdomen: for exclusion of malignancy

▶ TYPES

There is degeneration of motor neurons either in the spinal cord, cranial nerve nuclei or pyramidal neurons in the motor cortex.

Based on site of lesion

Spinal cord lesion:

- **Primary lateral sclerosis (PLS):** pure UMN lesion (rare)
- **Progressive muscular atrophy (PMA):** LMN lesion
- **Amyotrophic lateral sclerosis (ALS):** combined UMN & LMN lesions (UMN lesion in lower limbs and LMN lesion in upper limbs)

Cerebral lesion:

- **Progressive bulbar palsy:** medullary lesion
- **Pseudobulbar palsy:** cortical lesion

Based on type of lesion

- ***Pure UMN lesion:*** Primary lateral sclerosis, pseudobulbar palsy
- ***Pure LMN lesion:*** Progressive muscular atrophy, bulbar palsy
- ***Mixed lesion:*** Amyotrophic lateral sclerosis

Features and diagnosis of individual MND

A. Primary lateral sclerosis:

- Only UMN lesion in both upper and lower limbs
- Progressive quadriparesis with terminal pseudobulbar palsy

B. Progressive muscular atrophy:

- LMN lesion with fasciculation, wasting and weakness of distal limb muscles (begins from small muscles of hands)
- Loss of DTR (due to loss of anterior horn cells)

C. Amyotrophic lateral sclerosis:

- Spastic paraparesis with exaggerated DTR and extensor plantar response in lower limbs (UMN lesion) + fasciculation, wasting, weakness and loss of DTR (LMN lesion) in upper limbs.
- In advanced disease, there may be generalized hyperreflexia.
- At later stage, bulbar and pseudobulbar palsy develop.

D. Progressive bulbar palsy:

- **Clinical features:** Dysphagia (nasal regurgitation, dribbling of saliva), dysarthria and dysphonia ---- 3'D's
    - Speech: nasal
    - Nasal regurgitation
    - Tongue: wasted, wrinkled with fasciculations
    - Palatal palsy, absent gag reflex
    - Absent jaw jerk
    - Normal emotions
- **Site of lesion**: LMN lesions bilaterally in the nuclei of lower cranial nerves in medulla (IX, X, XI and XII)
- **Causes:** MND, GBS, syringobulbia, brainstem infarction, poliomyelitis, neurosyphilis, neurosarcoidosis

E. Pseudobulbar palsy:

more common in women, patient is emotionally labile (crying and laughing)

- **Clinical features:**
  - Speech: Slurred, slow, indistinct (Donald Duck or hot potato speech due to tight immobile tongue)
  - Tongue: Small, spastic and stiff tongue with inability to protrude it out; no fasciculation or wasting.
  - Palatal palsy, absent gag reflex
  - Exaggerated Jaw jerk
- **Site of lesion:** bilateral UMN or supranuclear lesion of lower cranial nerves IX, X, XI, XII
- **Causes:** recurrent bilateral stroke involving internal capsule, MS, MND

▶ TREATMENT

(No cure)

Supportive:

- Psychological support
- Physical / occupational rehabilitation
- Speech and communication therapy
- Nutritional care: high calorie food supplement, changing form and texture of food, enteral feeding, PEG
- Respiratory therapy (NIPPV)
- End of life management

Symptomatic:

- **Fatigue:** Pyridostigmine, amantadine
- **Depression / emotional lability:** SSRI, venlafaxine, amantadine
- **Cramps:** quinine sulphate, clonazepam, vitamin E
- **Fasciculations:** carbamazepine
- **Spasticity:** baclofen, tizanidine
- **Sialorrhea:** hyoscyamine sulphate, scopolamine patch
- **Joint pain:** analgesic, such as NSAIDs
- **Insomnia:** zolpidem tartrate
- **Respiratory failure:** bronchodilators

Neuroprotective agents:

- Riluzole: it may retard progression and prolong the survival.
- IGF-1, vitamin E, Coenzyme Q-10

▶ PROGNOSIS

- Life expectancy 3-5 years. Bulbar involvement correlates with rapid progression. Progressive lateral sclerosis and progressive muscular atrophy has relatively better outcome.

Cause of death:

- Bronchopneumonia, respiratory failure and complication of immobility

▶ CAUSES OF WASTING OF THE SMALL MUSCLES OF THE HAND

- Cervical spondylosis
- Cervical rib
- Pancoast's tumor
- MND
- Syringomyelia
- Charcot Marie Tooth disease
- Longstanding arthritis
- Peripheral neuropathy / combined median and ulnar nerve lesion
- Dystrophia Myotonica

▶ FIBRILLATIONS & FASCICULATIONS OF MUSCLES

Fibrillation

- It is the non-visible contraction of single muscle fibre or unit, diagnosed by EMG.

Fasciculation

- It is the visible spontaneous contraction of groups of muscles. They are usually present at rest but absent during voluntary muscle contraction. Tapping with finger or hammer over the muscle may illicit fasciculations. (However, this method is controversial and not accepted by all the neurologists, as fasciculations should be spontaneous). Fasciculation associated with wasting and weakness indicates LMN lesion.

Mechanism:

- It is due to spontaneous firing from surviving axons which have lost their nerve supply and strive to innervate the muscle fibres.

Causes:

- **Neurogenic:** MND, CMTD, spinal muscular atrophy, syringomyelia, CJD, cervical spondylosis, cervical rib, acute poliomyelitis (rarely in old polio), neuralgic amyotrophy.
- **Metabolic:** Tetany, anticholinergic drugs, organophosphorus poisoning
- **Normal:** anxiety, post-exercise, muscle cramps (called benign fasciculations)

5. Multiple sclerosis

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness and inability to walk

"What actually the problem is?"

- *"Do you have weakness in one or both legs?"* **(One or both legs)** (weakness in the right lower limb)
- *"Do you have difficulty in walking up stairs and getting out of chair or weakness in the feet or global weakness?"* ***(Proximal / Distal /Global weakness)***
- *"Are the legs stiff or floppy?"*
- *"Do you have weakness in any other part?"*
- *"Do you have any other problem with the legs like numbness or tingling? ... Any problem with the balance?"*
- *"Do you have any blurring of vision, swallowing difficulty, nasal regurgitation of food?"*

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *""How did it start? ... Did it start abruptly or gradually?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How severe is the weakness? ... Do you have any difficulty in walking without the help of others?"*
- **Aggravating / relieving factors:** *"What makes it worse? ... What make you feel better?"*
- **Ever had it before:** *"Have you ever had it before?"* History of similar attack previously ___ years ago with recovery after taking some medications prescribed by local doctors, the name of drugs the patient cannot mention.
- ***Associations (D/D):*** *(Also ask other questions of CNS)*
  - ***Spinal injury***
  - ***Respiratory, abdominal or gynecological neoplasm:***
    - *"Do you have any cough or chest pain? ... Any tummy pain or bowel problems? ... Any vaginal bleeding?"*
    - *"Do you have any backache or band-like chest pain worse on coughing, sneezing and straining?" (Suggest a level of spinal cord compression)*
  - ***Pott's disease:*** *"Do you have any swelling over the backbone or fever?"*
  - ***Hereditary spastic paraparesis:*** *"Any family history of leg weakness?"*
  - ***Myasthenia gravis:*** *"Is the weakness worse towards the end of the day?"*

Details of weight loss

- **Duration:** *"The time during which you lost the weight?"*
- **Onset:** *"How did it develop?"*
- **Progression:** *"Is it worsening with time?"* Progressive worsening wasting of muscles, involving the lower limbs initially and then hands and forearms with spontaneous twitching movements and muscle cramps.
- **Severity:** *"How much weight you have lost? ... What was your previous weight? ...... Do you feel your clothes are looser, looks thinner and friends or family members have noticed any change?"*
- **Associations (D/D):**
  - ***Non-gastrointestinal:***
    - ***Thyrotoxicosis:*** *"Any heat intolerance, shaking of hands, anxiety, recent loss of weight and increased appetite, racing of heart, increased bowel works frequency, eye symptoms?"*
    - ***Diabetes mellitus:*** *"Any increased frequency of water works or increased thirst?"*
    - ***TB:*** *"Any night-time fevers, cough or phlegm containing blood?"*
    - ***Adrenal insufficiency:*** *"Any weakness or dizziness?"*
  - ***Gastrointestinal:***
    - *"Is there any change in your appetite?"*

  - ***Primary neoplasm:*** *"Any difficultly in swallowing, tummy pain, nausea / vomiting, any blood in vomiting or bowel works, any altered bowel habit?"*
  - ***Malabsorption syndromes (coeliac disease, Crohn's disease):*** *"Any bulky, foul smelling and difficult to flush away bowel works, any diarrhoea?"*

Details of urinary incontinence

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How severe is the urinary incontinence? ... Do you have it during day and night both?"*
- **Aggravating / relieving factors:** *"What makes it worse? ... What make you feel better?"*
- **Association (D/D):**
  - **UTI:** *"Do you have any stinging while passing waters?"*

Details of constipation

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How often you have bowel movements?"*
- **Aggravating or relieving factors:** *"What makes it worse? ... What make you feel better?"*

▶ GENERAL EXAMINATION

As per findings

- Urinary catheter in situ

▶ SYSTEMIC EXAMINATION

CNS:

Higher mental functions:

- Conscious and oriented in time, place and person but speech is dysarthric and scanning.

Cranial nerves:

- **Fundoscopy**: optic disc of right eye shows temporal pallor, while the left eye is normal.
- **3rd, 4th & 6th CNs:** inability to adduct affected (right) eye and nystagmus in the contralateral eye (left), called internuclear ophthalmoplegia. Patient also complains of diplopia on lateral gaze.
- Other cranial nerves are intact.

Motor system:

- **Tone:** ↑ in right lower limb but normal in rest of the limbs.
- **Muscle power:** grade ____ in the right lower limb but normal in the rest of limbs.
- **DTR:** exaggerated in the right lower limb with extensor plantar response, normal reflexes in rest of the limbs
- **Clonus:** Patellar and ankle clonus are present in the right lower limb.
- **Abdominal reflex:** lost
- **Coordination:** impaired in right lower limbs (due to weakness)
- **Gait:** drunken gait.

Involuntary movement:

- Absent

Sensory system

- Loss of position and vibration sense; and two-point discrimination in the right lower limb.
- Other sensations are normal.

Examination of other systems

- No other abnormalities detected.

"My diagnosis is demyelinating disease (multiple sclerosis)."

Differential diagnoses

- Spinal cord compression

- SCD
- Neurosyphilis
- Recurrent attack of myelitis: Neurosarcoidosis, SLE, APLAS

DISCUSSION

▶ INVESTIGATIONS

- **MRI brain and spinal cord:** + in 80% cases. Hyperintense lesions (plaques) in T2W images which became more prominent on fluid attenuated inversion recovery (FLAIR) images. These lesions may be found anywhere in the CNS including both supratentorial and infratentorial regions, and spinal cord. However, typical locations of these lesions include the periventricular white matter, corpus callosum, cerebellar peduncles, brainstem, optic nerve, and subpial white matter of spinal cord (dorsal column and corticospinal tract). MRI also reveals asymptomatic plaques.
    - On T2W image, well demarcated asymmetrical white matter lesions adjacent to ventricular surface (periventricular lesion), particularly the linear or oval shaped lesions oriented perpendicular to the ventricular surface are diagnostic of MS. In sagittal view, these lesions extend outward from corpus callosum making fimbriated appearance called **Dawson fingers**.
    - Characteristic **C shaped partial ring** created by rounded lesion interrupted by gyrus.
    - Old lesions may develop cavitation appearing hypointense on T1W images called '**black holes**'.
- **CSF:** slightly increased lymphocytes, increased total protein (40% cases) and oligoclonal band (70-90% cases)
- **Delayed evoked potential:** mainly VEP if optic nerve involved.
- **Investigations for exclusion of other conditions:**
    - ***CXR:*** for exclusion of bronchial carcinoma
    - ***X-ray spine:*** for exclusion of cord compression
    - ***Serum ACE levels:*** for exclusion of sarcoidosis
    - ***Serum B12:*** for exclusion of SCD
    - ***ANA:*** for exclusion of SLE
    - ***Antiphospholipid antibodies:*** for exclusion of APLAS

▶ CAUSES (UNKNOWN)

- **Environmental factors:** more prevalent in temperate zone and rare in tropical regions.
- **Genetic factors**: 10 % increased risk in first degree relatives
- **Immunological factors:** activated T-lymphocyte and immunoglobulin rises suggestive of some immune mechanism.
- **Diet:** more in those who consume animal fats
- **HLA association:** A3, B7, DR2, DR3

▶ CLINICAL PRESENTATION

Common in women, 20-40 years of age. Only CNS is involved while peripheral nervous system is spared. The disease is disseminated in time and space. Two neurological lesions in different anatomically sites or appearing at different times indicates multiple sclerosis.

- **Weakness:** affecting one or more limbs
- **Sensory disturbance:** in one or more limbs, face
- **Cerebellar signs:** vertigo, dysarthria with scanning speech, tremors, nystagmus, ataxia
- **Optic neuritis (25%):** blurred vision. No finding on fundoscopy (neither the doctor nor the patient sees anything in retrobulbar neuritis)
- **Brainstem syndromes:** facial numbness or weakness, numbness or pyramidal signs in limbs, diplopia, vertigo, nystagmus, dysarthria, dysphagia
- **Transverse myelitis:** Features of spastic paraplegia like spinal cord compression
- **Bladder dysfunction:** incontinence, dribbling and hesitancy
- Euphoria despite disability
- Loss of abdominal reflex

Pregnancy has mild protective effect. However, exaggeration may occur in puerperium.

Triad of Steinberg

- Impotence, urinary incontinence and constipation

Causes of death

- Renal failure, bronchopneumonia

Clinical courses

- **Relapsing and remitting (80-90%):** characterized by acute attacks (relapses) with intervening remission (recovery)
- **Primary progressive MS (10-20%):** characterized by progressive neurological deterioration from onset
- **Secondary progressive MS:** few cases of relapsing and remitting disease characterized by gradual neurological deterioration.
- **Fulminating MS (< 10%)**

Uhthoff's phenomenon

- After a hot bath, the symptoms of MS exacerbate due to the slowing of nerve conduction by increased body temperature.

Lhermitte's sign (barber's chair sign)

- Electric shock like sensations which may pass down in the trunk and limbs produced on flexion of neck. It is due to the proximity of lesion to dorsal column nuclei in the higher cervical cord.
  (A similar electric shock like sensations produced by neck extension is called reverse Lhermitte's sign. It is produced cervical spondylosis)

Causes

  - MS
  - Cervical cord compression (by tumor)
  - Cervical spondylotic myelopathy
  - Subacute combined degeneration
  - Radiation myelopathy

▶ TREATMENT

During acute attack:

- **IV methylprednisolone:** 1 g IVI for 3 days or 500 mg orally for 5 days followed by prednisolone 40 mg/day PO for 10 days, then 20 mg for 2 days, then 10 mg for 2 days. (Steroids does not alter the course of disease but shortens the duration of attack. In optic neuritis, methylprednisolone reduces relapse rate over 2 years.
- **High dose prednisolone:** 40-60 mg/day for 10 days followed by tapering over 2 days
- **Plasmapheresis:** sometimes effective in severe relapse unresponsive to steroids.

For prevention of relapse (disease-modifying drugs):

- **Immunosuppressive drug:** azathioprine, cyclophosphamide, mitoxantrone
- **β interferon (1a or 1b) S/C or IM:** effective in reducing the number of relapse (30%)
- **Glatiramer acetate:** effective in reducing the number of relapses
- **Monoclonal antibody:** natalizumab, alemtuzumab
- **IVIG**

For complication and disability:

- **For incontinence, frequency or urgency:**
  - If post-micturition residual urine <100 mL → Give oxybutynin, tolterodine
  - if post-micturition residual urine >100 mL → Intermittent self-catheterization
- **For spasticity:** Physiotherapy; drugs like baclofen, tizanidine, benzodiazepine, dantrolene; local botulinum toxin injection IM or chemical neuronectomy; cannabis extracts, synthetic cannabinoids
- **For dysesthesia:** carbamazepine, phenytoin, gabapentin or amitriptyline
- **For ataxia:** INH or clonazepam

- **For fatigue:** amantadine, modafinil or amitriptyline
- **For impotence:** sildenafil
- **For infections:** antibiotics
- **Bed sores prevention**
- **Rehabilitation:** During remission, remain active; during relapses, avoid excessive physical exercise.

▶ PROGNOSTIC FACTORS

Good prognostic factors:

- Disease onset at early age
- Minimum neurological deficit at 5 years after onset
- Sensory or visual symptoms alone at presentation
- Relapsing and remitting type
- Female gender

Poor prognostic factors:

- Age > 40 years
- Short intervals between first 2 relapses
- Frequent relapses during first 2 years
- Pyramidal, brainstem and cerebellar symptoms
- Poor recovery from relapse
- Primary progressive disease

▶ DEMYELINATING DISORDERS

- ADAM
- Devic's disease (acute necrotising myelitis with optic neuritis)
- Leukodystrophies
- Tuberous sclerosis (patchy demyelination)
- Schilder's disease (diffuse cerebral sclerosis resulting in dementia, pseudobulbar palsy, cortical blindness, cerebral deafness, hemiplegia and quadriplegia.

6. Parkinsonism

▶ HISTORY (CHIEF COMPLAINTS)

Details of tremors

- **Duration:** *"Since how long you have the shaking of hands?"*
- **Onset:** *"From where it started first? ... Is it confined to the hands, arms or both? ... Is it in both the hands or only in one hand? ... In which hand or arm it is worse? ... Are you left- or right-handed?"* Initially tremors involved only one hand and later the other hand, tongue, head and rest of the body
- **Progression:** *"Is it worsening with time? ... Slowly or quickly?"*
- **Severity:** *"How bad it is? ...... Do you have shaking anywhere else like head, jaw or feet?"*
- **Associations (D/D):**
    - *"When you get shaking of your hands? ...... Are they present at rest, or appears on reaching a target, or holding your arms out? ...... Do they attenuate or worsen during activity?"*
  - ***Resting tremors (Parkinson's & Parkinson plus):*** *Resting tremors +*
    - *"Any rigidity, slowness of movements (bradykinesia), inability to roll over in bed, dribbling of saliva, loss of memory?" (resting tremors reduces during voluntary activity and are also absent during sleep)*
  - ***Intentional tremors (cerebellar):*** *tremors on reaching a target +*
    - *"Any difficultly in speech or swallowing? ...... Issue with balance or spinning of room? ...... Any weakness or numbness of limbs? ...... Any headache?"* ***(posterior circulation stroke, tumours, MS, Friedrich ataxia)***
  - ***Benign essential tremors:*** *Absent at rest, appears on holding arms out with worsening during activity.*
  - ***Physiological tremors (Anxiety, thyrotoxicosis):*** *Absent at rest, appears on holding arms out with attenuation during action.*
  - ***Chorea:*** *fleeting, purposeless, restless and fidgety*
  - ***Drug:*** *B-agonist inhalers, theophylline, cyclosporine*
  - ***Alcohol***

Details of other symptoms

- *"Do you have any history of fever, convulsion, headache, coma?"* ***(Post-encephalitic)***
- *"Any history of head injury?* ***(punch drunk syndrome)***
- *"Are you taking any drugs?" (fluoxetine, lithium, valproic acid, metoclopramide, tetrabenazine, α-methyldopa, phenothiazine, butyrophenone)* ***(Drugs)***
- *"Any yellowish discolouration of whites of the eyes or high coloured urine, abdominal distention?"* ***(Wilson's disease)***
- *"Any history of headache, vomiting, convulsion?"* ***(cerebellar tumor)***

▶ GENERAL EXAMINATION

As per findings

- Head titubation
- Apathetic or expressionless or mask-like face (less wrinkling of forehead)
- Staring gaze or serpentine stare (reduced frequency of spontaneous eye blinking)
- Blepharoclonus (tremors of eyelids on gently closing the eye)
- Dribbling of saliva

▶ SYSTEMIC EXAMINATION

CNS:

Higher mental functions:

- Conscious, oriented in time, place and person, and alert with intact intelligence and memory

- **Speech:** slow to initiate, slurred, indistinct, monotonous and low volume speech; palilalia (repeating the end of a word)

Cranial nerves and fundoscopy:

- CN are intact and fundoscopy is normal.

Motor system:

- **Tone:** ↑ with lead pipe and cog wheel rigidity
- **Power:** normal
- **DTR:** normal but difficult to elicit because of rigidity
- **Plantars:** flexor
- **Coordination:** could not be tested due to rigidity
- **Gait:** flexed and stooped posture; difficult to start the walk (freezing); paucity of movements with short shuffling steps; reduced arm swing; inability to turn rapidly.

Involuntary movement:

- **Tremors:** Resting tremor especially in the thumb and fingers (pill-rolling tremors), tremors disappear or reduce on activity or holding something.
- Head titubation

Other findings:

- **Glabellar tap (Myerson's sign):** repeated tapping of forehead above the nose bridge (twice / sec) produces a sustained blink response. Normally, blinking stops after 3-5 blinks. This test, however, is unreliable.
- **Hypokinesia:** movements are slow to initiate like drinking of water from a glass, fastening/unfastening of button, touching the fingertips with thumb successively.
- **Micrographia:** handwriting becomes small, cramped and tremulous

Sensory functions:

- Intact

Examination of other systems

- No other abnormalities detected.

"My diagnosis is Parkinson's disease (paralysis agitans)."

DISCUSSION

- It is a neurodegenerative disorder of basal ganglia. Also called Idiopathic parkinsonism /paralysis agitans.

▶ INVESTIGATIONS

Diagnosis is clinical and investigations are done for exclusion of other causes.

- CT scan or MRI brain
- Screening for Wilson's disease if age <50 years:
  - Serum copper ↑
  - Serum ceruloplasmin ↓
  - 24 hours urinary copper ↑; penicillamine challenge test → 24 hours urinary copper> 25 mmol.
  - LFTs deranged
  - Liver biopsy for quantitative measurement of copper

▶ CLINICAL FEATURES

Diagnostic criteria: Triad of

- **Resting tremors:** coarse (4-6 Hz), resting tremors, which disappear or attenuate during activity and sleep, and increase during stress and emotions. Begins with pill-rolling movements of thumb and index finger, abduction and adduction of thumb, flexion and extension of fingers, and pronation and supination of forearm. Subsequently, tremors may affect arms, jaw, tongue, legs and feet. Usually, the disease starts with unilateral resting tremor in hand. However, 1/3rd of cases don't have tremors at presentation and in some cases throughout the disease course.
- **Rigidity:**
  - ***Lead pipe:*** uniform rigidity during passive movements (best seen in elbow or knee)

- *Cog wheel:* rigidity interrupted by tremors (best seen in wrist joint)

Ask the patient for simultaneous active movement in other limb while carrying passing movement in the examining limb, the rigidity will be increased in the examining limb. This is a type of reinforcement.

Difference between rigidity and spasticity

- **Rigidity:** It is the sustained resistance felt during entire passive movement and caused by extrapyramidal lesion. If the resistance is uniform, it refers to lead pipe rigidity (better seen in elbow and knee). If the resistance is interrupted by tremors, it refers to cog wheel rigidity (better seen in the wrist joint).
- **Spasticity:** It is the increased resistance felt in the beginning of passive movement which lessens later. If the initial resistance is followed by sudden loss of resistance, it refers to clasp-knife type and caused by pyramidal lesions. Spasticity is felt better in anti-gravity muscles, while extending upper limbs and flexing lower limbs.

  Hysterical rigidity: There is proportionate increase in muscle tone with increasing manoeuvre. The more the limbs are examined or moved, the more rigid it becomes.

- **Bradykinesia:** dyskinesia (difficulty in initiating movement), bradykinesia (slowness of movement), poverty of movements

Gait abnormality

- **Festinant gait:** rapid small shuffling step to avoid falling with inability to raise the foot from the ground.
- **Stooped posture:** appearing to catch up with own centre of gravity
- **Reduced arm swing during walking**
- **Difficulty in stopping**
- **Inability in rapid turning:** en block turning with fractionated gait
- Movement freeze in place over the obstacles.

Other gait abnormalities

- **Propulsion:** inability to stop from falling when pushed from behind.
- **Retropulsion:** inability to stop falling backward when pushed from front.
- **Kinesia paradoxica:** Inability to initiate the movement, completing the whole movement once started and inability to stop once completed (may run down the stairs, but cannot stop at the bottom); or inability to initiate a movement, but can perform the movement during emotion or fear (can even run out of the house during fire).

DTR

- Difficult to elicit due to rigidity. It may be extensor in following

Mental status

- Dementia in advanced stage
- Depression in 1/3 of cases
- acute confusional state due to drugs

Parkinson-plus syndrome

- Parkinsonism features associated with other degenerative disorders like
  - Primary autonomic failure (Shy-Dragger syndrome).
  - Olivo-Ponto-cerebellar degeneration
  - Progressive supranuclear palsy (Steele-Richardson-Olszewski syndrome)
  - Nigrostriatal degeneration

▶ STAGES OF PARKINSONISM

- **Stage I:** Unilateral involvement (hemiplegic Parkinsonism)
- **Stage II:** Bilateral involvement without postural instability
- **Stage III:** Bilateral involvement with mild postural instability
- **Stage IV:** Bilateral involvement with severe postural instability requiring substantial help
- **Stage V:** Severe advanced disease (bedridden or restricted to wheelchair)

▶ PATHOLOPHYSIOLOGY

- **Idiopathic Parkinsonism:** caused by progressive degeneration of the pigmented dopaminergic neurons in substantia nigra and formation of Lewy bodies (intra-cytoplasmic inclusions: pathological hallmark of the disease). This neurodegeneration leads to reduced production of dopamine and an imbalance results between dopamine and acetylcholine.

Etiology:

Cause in unknown and multiple factors may be responsible:

- Idiopathic (Parkinson's disease or Paralysis agitans)
- Post-encephalitic (Japanese B encephalitis or encephalitis lethargica)
- Drugs: Butyrophenones (haloperidol), phenothiazines (chlorpromazine, prochlorperazine), tetrabenazine, metoclopramide, cisapride, sulpiride and methyldopa
- Repeated head injury: punch-drunk syndrome
- Neurosyphilis
- Poisoning: carbon monoxide, manganese and MPTP (methyl phenyl tetrahydropyridine)
- Herbicide: paraquat
- Genetic: Wilson's disease and Huntington's disease
- Cerebral tumor involving basal ganglia
- Parkinsonism plus syndrome
    - Primary autonomic failure (Shy-Dragger syndrome).
    - Olivo-Ponto-cerebellar degeneration
    - Progressive supranuclear palsy (Steele-Richardson-Olszewski syndrome): characterized by inability to look vertically or laterally and dementia)
    - Nigrostriatal degeneration
- Creutzfeldt-Jakob disease
- Hypoparathyroidism
- Normal pressure hydrocephalus (triad of dementia, gait apraxia and urinary incontinence)
- Vascular (arteriosclerotic) Parkinsonism: progressive stepwise deterioration with pyramidal signs)

▶ OCULOGYRIC CRISIS

Involuntary sustained upward and outward deviation of the eyes.

Etiology:

- Postencephalitic Parkinsonism
- Drugs (commonly phenothiazines)
- Petit-mal seizure

▶ TREATMENT

General measures:

- Treat the underlying cause and stop the offending drugs
- Physiotherapy; speech and occupational therapy; rehabilitation

Drug treatment:

Treatment is usually not started in mild cases due to the potential side effects of the drugs. Drugs are started in lowest possible dose with gradual increment according to the response.

- ***For rigidity, bradykinesia and tremors:***
    - Levodopa and carbidopa (co-careldopa 110 or 275 mg)
    - Levodopa and benserazide (co-beneldopa 62.5 mg).
- ***For tremors and rigidity:***
    - Anticholinergic drugs
- ***For cognitive impairment and psychiatric symptoms***
    - Rivastigmine

  - SSRI for depression
  - Atypical antipsychotic for psychosis, confusion or hallucination

Levodopa:

- Levodopa is metabolized rapidly and to prevent this peripheral metabolism, peripheral decarboxylase inhibitors (e.g. carbidopa, benserazide in 4:1 ratio) are given. Decarboxylase inhibitors can't cross blood brain barrier as do levodopa, therefore, levodopa soon after crossing blood brain is decarboxylated into dopamine.
- It is the first line of treatment in the elderly because it has best therapeutic index.
- ***Dose:*** 50 mg BID or TID increasing up to 1000 mg daily. Levodopa therapy has motor fluctuations after 3-5 years of treatment in 30-50% of the patients including:
  - **End of dose deterioration (wearing off effect):** Due to disease progression and reduction in the dopamine storage capacity, the duration of action of dose of levodopa gradually becomes shorter. The patient experiences rigidity and freezing before the next dose. Manage this wearing off effect by dividing the dose of levodopa into smaller but frequent doses or using slow-release levodopa preparations or adding amantadine or dopamine agonists.
  - **On-off phenomenon:** Effectiveness of levodopa is reduced after prolonged use. This causes unpredictable sudden alternating periods of severe Parkinsonism (freezing and rigidity) called off period, and periods of dopamine induced dyskinesias, dystonic movements, agitation and chorea (the on period). This complication is managed by adjusting the dose or inter-dose interval of L-dopa; or adding dopamine agonist or COMT inhibitor.
- ***Contraindications:***
  - PUD, narrow angle glaucoma, psychosis and malignant melanoma
  - Do not prescribe L-dopa to a patient already taking MAO-A inhibitors or within 2 weeks of stopping the drug, as it may cause hypertensive crisis due to cheese effect.
- ***Side effects:***
  - Postural hypotension, nausea, vomiting, orofacial dyskinesia, dystonia, depression, delusion and hallucinations.

Anticholinergics:

(Procyclidine, trihexyphenidyl, orphenadrine, benztropine, etc)

- Effective for control of tremors and rigidity but not effective for bradykinesia
- ***Contraindications:*** BPH, narrow angle glaucoma, obstructive gastrointestinal disease. Avoided in elderly patient
- ***Side effects:*** confusion, dry mouth, urinary retention, constipation, worsening of glaucoma

Dopamine receptor agonists:

- ***Types:***
  - **Ergot derivatives:** bromocriptine, lisuride, pergolide
  - **Non-ergot derivatives:** pramipexole, ropinirole, rotigotine

  All are given orally except rotigotine which is given as a transdermal patch. Used as alternative or as add on to levodopa therapy.
- ***Side effects:*** nausea, vomiting, anorexia, postural hypotension, leg edema, confusion, hallucination, abrupt or excessive sleepiness.

MAO-B inhibitor:

- ***Selegiline:*** It prevents the breakdown of dopamine. Dose: 5-10 mg in the morning. This is the only known drug which slows down Parkinson's disease by slowing degeneration in of dopaminergic neurons in substantia nigra. It is, therefore, recommended to use this drug in all Parkinsonism patients from early stage. Don't use tyramine rich food like cheese while using this drug as it may cause hypertensive crisis (cheese effect).
- ***Rasagiline:*** Use as adjuvant in patients with fluctuating response to levodopa as 1 mg daily in the morning.

Catechol-O-methyltransferase (COMT) inhibitors:

(Entacapone and Tolcapone)

- Give in combination with levodopa in patients with fluctuating response. It reduces the levodopa conversion to 3-O-methyldopa.

Amantadine:

- Mild antiparkinsonian effect due to potentiation of endogenous dopamine.
- Useful in the early disease or in conjunction with levodopa replacement.
- ***Dose:*** 100 mg 8 or 12 hourly
- ***Side effects:*** postural hypotension, peripheral edema, CCF, livedo reticularis, confusion, seizures, insomnia, hallucination, prostatic outlet obstruction

Surgical treatment: (Rarely done)

- ***Deep brain stimulation***
- ***Stereotactic pallidotomy or thalamotomy:*** Useful for controlling tremors of opposite side

▶ EXTRA-PYRAMIDAL SIDE EFFECTS OF ANTIPSYCHOTIC DRUGS

Phenothiazines (prochlorperazine, chlorpromazine, fluphenazine, perphenazine) butyrophenones (haloperidol), metoclopramide, etc. can produce multiple abnormal movements.

- **Drug induced parkinsonism:** tremors are less marked, usually responds to anticholinergic drugs.
- **Dystonia:** metoclopramide and prochlorperazine are notorious for this side effect
- **Akathisia:** restlessness with irresistible and repetitive movements.
- **Tardive dyskinesia:** characterized by orofacial dyskinesia like lip smacking, pouting and grimacing, chewing. Usually seen with the use of phenothiazines and butyrophenones for at least 6 months. It may persist or worsen even after the drug withdrawal. Tetrabenazine may be helpful.

▶ TYPES OF DYSKINESIA OR MOVEMENT DISORDER

Hypokinetic:

- PD
- PD plus

Hyperkinetic:

- ***Rhythmic:*** Tremors
- ***Non-rhythmic:***
  - Dystonia (site of lesion not known)
  - Tics (site of lesion not known)
  - Myoclonus (lesion in multiple areas of brain)
  - Chorea (lesion in the caudate nucleus)
  - Athetosis (lesion in the putamen)
  - Hemiballismus (lesion in the subthalamic nucleus)

7. Myasthenia Gravis

▶ HISTORY (CHIEF COMPLAINTS)

Details of weakness after activity

- **Duration:** *"Since how long you have this problem?"*
- **Onset:** *"How it was first noticed? .... Was it sudden or gradual onset?"*
- **Progression:** *"Is it worsening since then?"*
- **Severity:** *"How severe is the weakness?"*
- **Aggravating factors:** *"What makes it worse?"* (Weakness/symptoms worsens after exercise, activity or towards the end of the day)
- **Relieving factors:** *"What make you feel better?"* (weakness improves after taking rest)

Details of difficulty in keeping the eyes open (ptosis)

- **Duration:** *"Since how long you have this problem?"*
- **Progression:** *"Is it worsening since then?"*
- **Severity:** *"Is it in one or both of your eyes? Are you completely unable to open it or it is incomplete?"*
- **Aggravating factors:** *"Is it worse after looking upwards for a prolonged time?"*
- **Relieving factors:** *"What makes it better?"*

Details of double vision

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *"How it was first noticed? .... Was it sudden or gradual onset?"*
- **Progression:** *"Is it worsening over time?"*
- **Severity:** *"Which direction you can't read the print?"*
- **Aggravating factors:** *"Which part of the day you can read the print and when it worsens?"*
- **Relieving factors:** *"Does it improve after closing of one eye?"* **(MS, nerve involvement)**

Details of difficulty in chewing and swallowing

"Can you please tell me what exactly the problem is?"

  - *"Do you have difficulty in chewing or difficulty in swallowing? ... Do you feel difficulty in initiating swallowing with coughing, choking or nasal regurgitation? ... Any feeling of sticking of food in your food pipe?"*

- **Duration:** *"Since how long you have difficulty in swallowing?"*
- **Progression:** *"Is it getting worse?"*

Details of difficulty in speaking

- **Duration:** *"Since how long you have difficulty in speaking?"*
- **Progression:** *"Is it getting worse?"*

Details of drug and treatment history

- *"Are you taking any medication (e.g. D-penicillamine, etc.)?"*

▶ GENERAL EXAMINATION

As per findings

- Bilateral partial ptosis: Present

▶ SYSTEMIC EXAMINATION

CNS:

Higher mental functions:

- Normal

Cranial nerves and fundoscopy

- CNs are intact and fundoscopy is normal.

Motor system:

- **Tone:** normal
- **Power:** grade 4/5 in all the limbs
- **Fatiguability test (Ceiling test):** may be +, with worsening of ptosis on sustained upward gaze.
- **Diplopia:** double vision on eye movements due to extra-ocular muscles weakness on both sides
- **Single breath count:** Voice became low and indistinct when patient is asked to count 1 to 100.
- **Ice on eyes test**
- **DTR:** normal, plantar flexors
- **Coordination:** normal
- **Romberg's:** normal
- **Gait:** normal

Involuntary movements:

- absent.

Cerebellar signs:

- Absent

Sensory system:

- Intact

Examination of other systems

- No other abnormalities detected.

"My diagnosis is myasthenia gravis."

Differential diagnoses

- Drug induced myasthenia
- Polymyositis
- Eaton Lambert syndrome

DISCUSSION

▶ INVESTIGATIONS

- **Anti Ach-receptor Ab:** positive in 80 - 90% cases with generalized MG, while positive in 50% cases of pure ocular MG
- **Anti-MuSK Ab:** +ve in pure ocular MG; anti-AChR Ab -ve cases; cases with predominantly facial, bulbar and neck muscle involvement.
- **CXR PA & lateral view:** for thymoma exclusion
- **CT scan Thorax**
- **NCS & EMG**
  - *NCS:* 10% decremental response on repetitive nerve stimulation
  - *EMG:* Single fibre jitter
- **Tensilon Test:** Give edrophonium bromide IV 2 mg, if no side effects after 30 seconds, give further 8 mg IV. If test is positive, then symptoms improve within 30 seconds lasting for 2-3 minutes. Sensitivity is 80%. Perform this test only where resuscitation facility is available. Atropine should be kept ready. It can cause bronchoconstriction and syncope.
- **Autoimmune screening**

Bedside tests

- **Single breath count test:** Voice deteriorates & becomes nasal when patient is asked to count from 1 to 50.
- **Fatiguability test (or Ceiling test):** ptosis worsens when patient is asked to look straight or at the ceiling.
- **Peek sign:** Tightly closed eye lids separate (peek) showing the white sclera when patient is asked to close the eyes tightly. This is called peek sign.

- **Ice on eyes test:** Ptosis improve when ice cube is placed on eyes for 2 minutes or up to maximum tolerability. The test is highly specific and sensitive in myasthenic diplopia.

CLINICAL FEATURES

It is an autoimmune disease caused by IgG antibodies directed against acetylcholine receptor proteins.

- In young age (<50 years), the disease is more common in women, commonly associated with other autoimmune conditions and thymic hyperplasia. Albeit, in the elderly (>50 years), the disease is more common in men and associated with thymic atrophy or thymic tumor.
- The characteristic feature of this disease is fluctuating muscular weakness, more marked after physical activity or towards the ends of the day. Muscles groups commonly involved are in the order of extraocular, bulbar, facial, neck, limb girdle and trunk. Cardiac muscles are not affected.

Myasthenic crisis

Precipitating factors

- Exertion
- Emotions
- Infection
- Change of climate /extremes of temperature
- Pregnancy
- Surgery
- Drugs (aminoglycosides, penicillamine, propranolol, ciprofloxacin, quinine, antiarrhythmic drugs, steroids)
- Hypokalemia

Treatment

- Treat in ICU. Monitor lung functions closely.
- Stop all anticholinesterase drugs
- Mechanical ventilation and chest physiotherapy
- IVIG or plasmapheresis
- Antibiotics

Cholinergic crisis

- ***Etiology:*** anticholinesterase drugs overdosage leading to depolarization block of motor end plates.
- ***Features:*** paralysis or severe muscle weakness, fasciculations; muscarinic side effects like excessive salivation/sweating, lacrimation, urinary incontinence, diarrhoea/abdominal cramps, respiratory secretions, miosis, pallor, collapse and confusion.
- Edrophonium should be avoided in these patients.
- ***Treatment:*** Avoid edrophonium. Give atropine.

Differentiation between myasthenic crisis and cholinergic crisis

There is muscle weakness in both scenarios.

- ***Muscarinic features:*** present only in cholinergic crisis but absent in myasthenic crisis.
- ***Pupil:*** miosis in cholinergic crisis, but normal in myasthenic crisis.
- In myasthenic crisis—edrophonium causes quick improvement.

EXACERBATING FACTORS

- Exertion
- Emotions
- Infection
- Change of climate /extremes of temperature
- Pregnancy
- Surgery
- Drugs (amino glycosides, penicillamine, propranolol, ciprofloxacin, quinine, antiarrythmic)
- Hypokalaemia

▶ TREATMENT

Symptomatic management:

- **Anticholinesterase drugs:** Pyridostigmine 60 mg tablet (4-16 tablets in divided doses up to 05 times a day). Duration of action is 3-4 hours. These drugs inhibit acetylcholinesterase enzyme; therefore, the degradation of acetylcholine is inhibited which prolong the effect of acetylcholine released at NMJ. (overdose can result in cholinergic crisis)

Definitive:

- **Thymectomy:** improvement in 1-10 years after surgery.
  Indications:
    - Thymoma / thymic hyperplasia
    - Anti-Ach receptor Ab positive generalized MG cases who are <45 years, unless the disease is present for >7 years.
    - If no thymoma, thymectomy is still beneficial in 60% patients

  Prognosis after thymectomy:
    - Prognosis improves after thymectomy, especially in women with positive ACR Ab, even if there is no thymoma. The cases having anti-MuSK Ab do not improve with thymectomy, for such patients, the treatment of choice is plasmapheresis.
- **Plasmapheresis:** Recommended in severe myasthenia or myasthenic crisis or before thymectomy. Five plasma exchange sessions are carried out over two weeks period, during each exchange 3-4 litres of fluid is given.
- **IVIG:** Recommended in severe myasthenia or crisis, and also as an alternative to plasma exchange in a dose of 0.4 g/kg daily for 5 days. It is effective in 70% cases. Side effects include fluid overload, anaphylaxis in IgA deficiency, headache and flu-like symptoms.
- **Steroid:** steroids exacerbate the symptoms initially, therefore, the treatment with steroids should be commenced in the hospital setting. Start prednisolone, in a low dose to minimize the side effects, 5 mg OD with 5 mg/week increments up to a dose of 1 mg/kg; continue for 1 - 3 months, then gradually modify over 1-3 months to an alternate day regimen; reduce the dose over months once remission is achieved. Steroids are effective in 70% of cases. Add azathioprine (2.5 mg/kg daily) or methotrexate weekly, if needed. Trial of methylprednisolone IV may also be given.
- **Immunosuppressants:** azathioprine (2.5 mg/kg/day), mycophenolate mofetil

▶ DRUGS AVOIDED IN MG

- Aminoglycosides, ciprofloxacin, penicillamine, antiarrhythmic drugs, quinine

▶ EATON-LAMBERT SYNDROME

It is a paraneoplastic syndrome and commonly associated with small cell carcinoma, preceding 1-2 years or accompanying the actual disease.

Pathophysiology:

- Autoantibody against P/Q type voltage gated calcium channels on the motor end plates result in defective acetylcholine release at the NMJ.

Clinical features:

- Proximal muscle weakness with easy fatigability, usually involving lower limbs but any muscle can be affected. Bulbar involvement is rare. Weakness starts from limbs and progress to eyes (in myasthenia weakness starts from eyes and progress to limbs).
- DTR are either absent or diminished (characteristic sign) which reappear soon after a sustained contraction.
- Muscle strength and DTR transiently improve after repeated activity (reverse of myasthenia gravis).

Investigation:

- **EMG:** progressive incremental response after repetitive nerve stimulation (reverse of MG, where the response is decremental)

Treatment:

- Prednisolone plus azathioprine
- 3, 4 diaminopyridine (DAP)
- Guanidine hydrochloride
- Plasmapheresis
- IV immunoglobulin
- Anticholinesterase drugs: There is variable response with anticholinesterase drugs given alone or in combination with guanidine hydrochloride.
- Treat the primary pathology (e.g. bronchial carcinoma)

8. Friedreich's ataxia

▶ HISTORY (CHIEF COMPLAINTS)

Details of lower limbs weakness and difficulty in walking

"What actually the problem is?"

- *"Do you have weakness in one or both legs?"* **(One or both legs)**
- *"Do you have difficulty in walking up stairs and getting out of chair or weakness in the feet or global weakness?"* ***(Proximal / Distal /Global weakness)***
- *"Are the legs stiff or floppy?"*
- *"Do you have weakness in any other part?"*
- *"Do you have any other problem with the legs like numbness or tingling? ... Any problem with the balance?"*
- *"Do you have any problem with your balance or vertigo, difficulty in swallowing, or speaking?"*

- **Duration:** *"Since how long you have the problem?"*
- **Onset:** *""How did it start? ... Did it start abruptly or gradually?"*
- **Progression:** *"Is it worsening with time?"* (progressively increasing weakness)
- **Severity:** *"How severe is the weakness? ... Do you have any difficulty in walking without the help of others?"* **Aggravating / relieving factors:** *"What makes it worse? ... What make you feel better?"*

Details of wasting of muscles of feet and legs

- **Duration:** *"Since how long you the wasting of muscles of foot and legs?"*
- **Progression:** *"Is it worsening with time?"* (progressive worsening of muscle wasting in the lower limbs, initially involving the feet and then legs)

Details of tingling and numbness in lower limbs

- *"Can you please tell me where exactly the problem is? ... Which part of your legs? ... Up to which level? ... Is it in one leg or both? ... Which leg had the symptoms first?"*
- *"Do you have such symptoms in your hands as well?"*

- **Duration:** *"Since how long you have the problem?"*
- **Progression:** *"Is it worsening with time?"*
- **Severity:** *"How bad it is? ... Does it affect your sleep?"*
- **Aggravating factors:** *"What makes it worse?"*
- **Relieving factors:** *"What makes it better?"*

▶ GENERAL EXAMINATION

As per findings

- High arched palate
- Kyphoscoliosis
- Cocking of toes, pes cavus

▶ SYSTEMIC EXAMINATION

CNS:

Higher mental functions:

- **Speech:** scanning
- Rest of the higher mental functions are intact

Cranial nerves:

- **Fundoscopy:** Optic atrophy
- **Hearing:** impaired
- Other CNs are intact

Motor system:

- **Wasting:** in both legs
- **Tone:** decreased in both lower limbs
- **Power:** decreased in the lower limbs but normal in upper limbs
- **DTR:** knee and ankle jerks are absent on both sides, planters are extensor bilaterally. DTR are normal in both upper limbs.
- **Coordination:** could not be tested due to weakness of muscles
- **Romberg:** positive
- **Gait:** ataxic gait

Involuntary movements

- Not present

Sensory system:

- Dorsal column: Impaired position and vibration sense; and two-point discrimination in both the lower limbs.
- Spinothalamic: normal

Cerebellar signs:

- **Speech:** dysarthria with scanning speech
- **Nystagmus:** Horizontal nystagmus in both eyes
- **Finger nose test:** dysmetria and past pointing
- **Dysdiadochokinesia:** present
- **Gait:** ataxic gait (cerebellar)
- **Action /intension tremors:** present
- **Titubation:** absent

Examination of other systems

- No other abnormalities detected.

"My diagnosis is Friedreich's ataxia."

Differential diagnosis

- Multiple sclerosis
- Tabes dorsalis
- Spinocerebellar degeneration

DISCUSSSION

Investigations

- CBC, ESR
- BSR: high in 10%
- CXR: increase cardiothoracic ratio
- ECG: look for arrhythmia
- MRI brain / spinal cord: cerebellar and spinal cord atrophy
- NCS: only sensory action potentials are small or absent; however, conduction velocity in motor fibres is normal or mildly reduced.

▶ CLINICAL FEATURES

- It is mostly inherited as autosomal recessive trait, and rarely as autosomal dominant trait. It is the most common hereditary ataxia resulting from mutation of FRDA gene on chromosome 9 (abnormal expansion of trinucleotide repeat within a gene that code for protein 'Frataxin' which prevents intramitochondrial iron overloading).
- Usual age of onset is < 15 years (8-16 years)

Symptoms;

- Dysarthria, lower limb weakness, progressive difficulty in walking (truncal and lower limbs ataxia).

Signs:

- **Cerebellar signs:** dysarthria, vertigo, intention tremors, nystagmus, gait ataxia
- **Dorsal column signs:** absent position and vibration sense, Romberg's sign +ve
- **Corticospinal tract sign:** extensor plantars, weakness
- **Peripheral nerves:** absent deep tendon reflexes in lower limbs, wasting of muscles
- **Skeletal abnormalities:** high arched palate, kyphoscoliosis, cocking of toes, pes cavus, spina bifida
- **Diabetes mellitus**
- Optic atrophy
- Hypertrophic cardiomyopathy (may be a cause of sudden death)
- Deafness

Sites of lesion

- Cerebellar lesion: spinocerebellar tract signs
- Posterior column and dorsal root ganglia lesion: loss of vibration and position sense
- Degeneration of peripheral sensory fibres
- Corticospinal tract lesion (lateral column lesion)
- Eye (optic atrophy)

▶ PROGNOSIS

- Progressive disease with death before 40 years (patient usually die 20 years after the onset of symptoms due to cardiac and respiratory complications); chair-bound 9-15 years after the onset of symptoms.

▶ CAUSES OF PES CAVUS

- Congenital
- Friedreich's ataxia
- Hereditary motor and sensory neuropathy
- Charcot-Marie-Tooth disease
- Spinocerebellar degeneration
- Old poliomyelitis (unilateral), childhood peripheral neuropathy

▶ CAUSES OF COMBINED PYRAMIDAL, CEREBELLAR AND DORSAL COLUMN SIGNS

- Multiple sclerosis
- Friedreich's ataxia
- Spinocerebellar degeneration
- Syphilitic meningomyelitis
- Arnold-Chiari malformation

▶ DIFFERENT TYPES OF HEREDITARY ATAXIAS

Autosomal recessive:

- Friedreich's ataxia
- Ataxia with vitamin E deficiency, ataxia telangiectasia

Autosomal dominant:

- Spinocerebellar ataxia type 1-28
- Episodic ataxia

X-linked:

- FXTAS (Fragile X-associated tremor/ataxia syndrome)

Mitochondrial:

- MELAS (Mitochondrial encephalomyopathy, lactic acidosis and stroke)
- MERRF (Myoclonic epilepsy with ragged red fibres)
- KSS (Kearns-Sayre syndrome)

SHORT CASES

A. CARDIOLOGY SHORT CASES

I. Cardiology examination

Introduction & consent

"Hello, my name is Dr __________. I would like to examine your heart, is that ok? ...... Right."
Position the patient appropriately, sitting up at 45°. Expose them to the waist (for female patients, delay until examining the precordium). Explain what you are doing throughout.

1. General inspection

- General state (ill/well)
- Color (pale, cyanosed, flushed)
- Short of breath
- Scars on chest wall (midsternotomy scar of CABG, lateral thoracotomy scar)
- Look for clues (oxygen, GTN spray)

2. Hands

Inspect

- ***Skin:*** Peripheral cyanosis, tendon xanthomata, Janeway lesions, Osler's nodes (signs of infective endocarditis)
- ***Nails:*** clubbing, splinter hemorrhages, nail bed pulsation (Quincke's sign of AR)

Capillary refill time Normal capillary refill time is less than 2 seconds.

Temperature

3. Radial and brachial pulses

"I am going to take your pulse."

- ***Radial:***
  - **Rate, rhythm**
  - **Radio-radial delay:** palpate pulse bilaterally simultaneously
  - ***Radio-femoral delay:*** *palpate ipsilateral pulses simultaneously. "I going to feel your pulse in the groin."*
  - **Collapsing pulse:** identify radial pulse then wrap your fingers around wrist. Before elevating arm from the elbow check for pain in arm/ shoulder. *"Do you have pain in your arm or shoulder?"* Lift arm straight up. (collapsing pulse, felt as 'water-hammer' pulsation).
- ***Brachial:*** (Just medial to tendinous insertion of biceps)
  - **Waveform character**

4. Blood pressure

"I am going to take your blood pressure now."

- ***Hyper- or hypotensive***
- ***Pulse pressure:***
  - **Wide:** AR, arteriosclerosis
  - **Narrow:** AS, dry

5. Neck

JVP

- *"Can you slightly turn your head to the left."* Look at the supraclavicular fossa and comment on the height of the JVP and waveform.
- *"I am going to press your tummy."* Press on the abdomen to check the abdomino-jugular reflex.

Carotid pulse

- ***Inspect:*** visible carotid pulsation Corrigan's sign of AR
- ***Palpate:*** *"I am going to feel pulse in your neck."* Check volume and character on one side then the other.

6. Face

- ***Color:*** Pale, flushed, central cyanosis
- ***Features:*** Corneal/senile arcus, xanthelasma
- ***Pallor of the conjunctiva*** anaemia

- ***Malar flush*** mitral stenosis
- ***Dental hygiene***

7. The precordium

Inspect

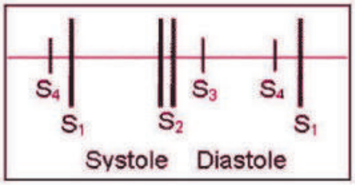
- ***Scars:*** midline sternotomy, lateral thoracotomy (mitral stenosis valvotomy)

Palpate

- ***Apex beat:*** lowermost lateral pulsation. Normal position 5th intercostal space, 1 cm medial to the midclavicular line. Measure position by counting intercostal spaces (sternal notch 2nd intercostal space).
  - **Undisplaced/displaced**
  - **Impalpable:** dextrocardia/COPD
  - **Character:**
    - *Heaving (PRESSURE-OVERLOADED): AS, hypertension*
    - *Thrusting (VOLUME-OVERLOADED): AR, MR*
    - *Taping: palpable S_1 in MS*
    - *Double or triple apical impulse: hypertrophic cardiomyopathy*
  - **Count rate** if pulse irregular (AF)
- ***'Heaves' and 'thrills':*** place the heel of the hand flat on chest to left then right of sternum.
  - **Heave:** sustained, thrusting usually felt at left sternal edge (right ventricular enlargement).
  - **Thrill:** palpable murmur felt as a vibration beneath your hand.

Auscultate

Palpate carotid pulse simultaneously



- ***Apex (mitral area):*** listen with bell and diaphragm.
  - Identify 1st and 2nd heart sounds. Are they normal?
  - Added sounds
    - Third heart sound has a rhythm similar to "Kentucky"
    - Fourth heart sound rhythm is similar to "Tennessee." where the syllable 'Ten' is S4.
  - Murmurs:
    - Pansystolic murmur radiating to the axilla (MR): Listen with the diaphragm.
    - *"Please roll over onto your left side, breathe out, and hold it there." mid-diastolic rumbling murmur (MS):* listen with the bell.
- ***Lower left sternal edge (tricuspid area)***
- ***Left of manubrium in the 2nd intercostal space (Pulmonary area)***

if suspect right-sided murmur, listen with patient's breath held in inspiration.

- ***Right of manubrium in 2nd intercostal space (aortic area):*** ejection systolic murmur radiating to the carotids (aortic stenosis)
- ***Lower left sternal edge in sitting position:*** *"Can you please sit up for me...... Breathe all the way out and hold your breath."* Listen for early diastolic murmur of AR
- **Below left clavicle:** Always listen for patent ductus arteriosus murmur.

8. To complete the examination

- ***Sacral & ankle edema:*** *"I am going to press your lower back for any swelling ... and now your shins."*
- ***Auscultation of lung bases:*** *"I am going to listen to your chest. Please take steady deep breath through your mouth."* Listen for inspiratory crackles.
- Examine the abdomen for a pulsatile liver and aortic aneurysm.
- Check peripheral pulses, observation chart for temperature and O_2, sats, dip urine.
- ***Fundoscopy:*** Examine the fundi for Roth's spots in endocarditis and for hypertensive changes.

II. CASE PRESENTATION

1. Mitral stenosis

CASE PRESENTATION:

Well, I have examined this gentleman, he has malar flush.

- **His**
  - Pulse is 70-80 / min, irregularly irregular and is of variable volume (low volume if regular), no radio-radial or radio-femoral delay.
  - BP is 100/80 mmHg with narrow pulse pressure.
  - JVP is not raised.
  - There are no scar marks in the chest (or left thoracotomy scar from previous valvuloplasty)
- **Apex beat** is un-displaced and tapping in character.
- **On palpation** there is apical thrill diastolic in nature (may not be present)
- **On auscultation**
  - 1st Heart sound is loud, and the 2nd heart sound is normal
  - Early diastolic opening snap
  - There is a mid-diastolic rumbling murmur at the apex with presystolic accentuation, heard best in expiration with the patient in left lateral position with the bell of stethoscope
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is Mitral Stenosis. He has AF. He is not in heart failure and there are no stigmata of infective endocarditis.

Differential Diagnosis

- **Tricuspid stenosis:** MDM loudest in left lower parasternal edge which increases during inspiration, raised JVP and signs of right heart failure.
- **Austin Flint murmur of severe AR:** no loud S_1 or presystolic accentuation, no diastolic thrill or opening snap. Presence of other features of AR.
- **Left atrial myxoma** (physical signs and murmur change with posture. History of fever, weight loss, myalgia, arthralgia, skin rash, Raynaud's phenomenon) or **ball valve thrombus in left atrium** or **cor-triatriatum**

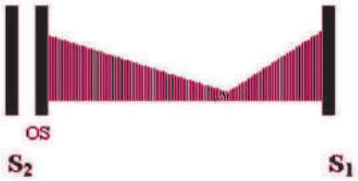
Carey Coomb's murmur (a soft MDM due to mitral valvulitis in acute rheumatic fever)

Note: If Pulmonary HTN then following may also be present

- Raised JVP
- Left parasternal heave and thrill
- Pulmonary component of the S_2 may be palpable and loud as well
- There is another pansystolic murmur at the left lower sternal edge that becomes louder on inspiration
- There may be early diastolic Graham-Steel murmur of pulmonary regurgitation as well which becomes louder in inspiration

Remember:

- **Tapping apex beat:** accentuated palpable 1st heart sound.
- **Opening snap:** short, sharp high-pitched sound, heard immediately after S_2 (during diastole), produced by sudden opening of mitral valve due to raised left atrial pressure (valve leaflets snapping into the left ventricle). Opening snap is usually found in MS (rarely in TS).



  - Indicates valve cusp is still mobile (absent in calcified valve)
  - The gap between S_2 and opening snap indicates the severity of MS. The diminishing gap indicates severe MS.
  - It is always due to organic MS.
- **Low pitched decrescendo-crescendo rumbling diastolic murmur** with late accentuation.
- **Presystolic accentuation of the MDM:** It is due to atrial systole, which increases the flow across the stenosed mitral valve from left atrium to left ventricle, causing accentuation or loudness of the murmur. Occurs if the patient is in sinus rhythm and is absent if there is AF.

- **Lutembacher's syndrome:** Combination of ASD with rheumatic MS (it occurs in 4% cases of ASD).

DISCUSSION

SEVERITY OF MITRAL STENOSIS:

(Normal mitral valve area 4 - 6 cm^2)

Severity of mitral stenosis	Severity Valve area (cm^2)	Gradient (mmHg)
Mild	1.6 - 2.0	< 5
Moderate	1.0 - 1.5	5 - 10
Severe	< 1.0	> 10

CAUSES:

- **Rheumatic:** commonest cause. If there is no history of rheumatic fever, even then it is likely to be rheumatic fever, because history of rheumatic fever may be absent in 40% of cases.
- **Congenital:** Parachute valve with all chordae inserting into one papillary muscle

CLINICAL SIGNS OF SEVERITY

- **Pulse:** low volume
- **BP:** Narrow pulse pressure (difference between systolic and diastolic BP)
- Diastolic thrill at the apex (rare)
- **Soft S_1**
- **Murmur:**
  - Early opening snap
  - Prolong mid-diastolic murmur
- **Pulmonary hypertension**
  - Prominent 'a' wave in JVP
  - Left parasternal heave, epigastric pulsation (indicates RVH)
  - Palpable P_2
  - Loud P_2 on auscultation
  - Early diastolic murmur (Graham Steel murmur due to pulmonary regurgitation)
  - Functional TR

INVESTIGATIONS

- **ECG:**
  - AF
  - P-mitrale (broad bifid in sinus rhythm)
- **CXR:**
  - ***Left heart border mitralization:*** Straightening of left heart border due to fullness of pulmonary conus (dilated pulmonary artery) and filling of pulmonary bay (prominent left atrial appendage).
  - ***Enlargement of left atrium:*** double left atrial shadow, displaced left main bronchus with splayed carina, big left atrial appendage.

  - ***Pulmonary hypertension***
    - Large central pulmonary arteries
    - Pruned peripheral arterial tree
  - ***Pulmonary edema***
    - Upper lobe blood diversion: upper lobe veins are dilated (early feature). Normally, ratio between upper and lower lobe veins is 1:3, which is altered to 1:1.
    - Kerley's B lines: horizontal septal lines in costophrenic angle, which indicates pulmonary hypertension.
    - Mottling or reticulonodular shadow due to pulmonary hemosiderosis.
  - ***Calcified mitral valve*** (best seen in fluoroscopy)
- **Echocardiography**
  - Valve area (in severe MS < 1.0 cm^2)
  - Thickened mitral valve leaflet, valve calcification (increased echogenicity)
  - Diastolic doming of anterior mitral leaflet and restricted movement of posterior mitral leaflet
  - Shortening of chordae tendinae
  - Reduced valvular area (button like or funnel shaped)
  - Loss of characteristic "M" shape movement of anterior leaflet normally seen in diastole and reduced diastolic slope (EF)
  - Enlarged left atrium.
  - Reduced rate of diastolic filling of left ventricle
  - Thrombus may be seen
- Coronary angiography if >40 years or CT angiography if less than 40 years

▶ MANAGEMENT

- **Medical:**
  - ***AF:***
    - **Rate control:** Patients with mitral stenosis poorly tolerate acute AF and therefore require rate control as quickly as possible using short acting beta-blockers such as esmolol through a continuous infusion. Remember digoxin and amiodarone takes few hours to take effects.
    - **Oral anticoagulation**
  - ***Diuretics***
- **Percutaneous balloon mitral valvuloplasty (PBMV):** Ballooning is treatment of choice in MS, BUT in AS. Only go for balloon valvuloplasty if patient can't tolerate surgery.

  Indications:
  - Pure MS
  - Minimal regurgitation
  - Pliable, non-calcified valve
  - No left atrial thrombus

  Contraindications:
  - Moderate to severe MR
  - Heavily calcified mitral valve
  - Left atrial thrombus
  - Concomitant CAD or other valve disease requiring surgery
- **Surgery:** closed mitral valvotomy (without opening the heart) or open valvotomy (requiring cardiopulmonary bypass) or mitral valve replacement.

  Indications: failure to respond to medical therapy of following conditions
  - Progressive dyspnea
  - Pulmonary edema
  - Major hemoptysis

- **Treatment of MS in pregnancy**
    - Bed rest
    - Anaemia correction
    - Severe symptomatic tight MS: Mitral valvotomy may be done usually in middle trimester
    - Complete full term with caesarean section.
    - Advise to restrict number of pregnancy (1 to 2)

▶ COMPLICATIONS

- Infective endocarditis
- Embolic complications from AF
- Pulmonary hypertension
- **Ortner's syndrome:** hoarseness of voice due to left recurrent laryngeal nerve palsy caused by pressure inflicted over the nerve due to left atrial enlargement

▶ PROGNOSIS

- Asymptomatic latent phase 15-20 years
- Symptomatic NYHA class > II: mortality 50% at 5 years

RHEUMATIC FEVER

▶ DUCKETT–JONES DIAGNOSTIC CRITERIA

- **Proven β-haemolytic streptococcal infection** diagnosed by
    - Throat swab
    - Anti-streptolysin O titre (ASOT)
    - Rapid antigen detection test (RADT) or
    - Clinical scarlet fever

  PLUS
- **2 major or 1 major & 2 minor criteria:**

Major	Minor
• Chorea	• Previous rheumatic fever
• Carditis & valvulitis	• Prolonged PR interval
• Migratory polyarthritis	• Arthralgia
• Erythema marginatum	• Fever
• Subcutaneous nodules	• Elevated acute phase reactants (raised ESR)

▶ TREATMENT

- **Rest**
- **High-dose aspirin:** With regards to use of anti-inflammatory agents, case series suggest there is little difference between use of corticosteroids and aspirin (NSAID of choice in this situation).
- **Penicillin:** Even where Group A streptococci are not isolated usually because of the length of time from the set of symptoms to presentation, antibiotic therapy is indicated to reduce the risk of recurrent episodes of RF.

▶ PROPHYLAXIS

- **Primary prevention:**
    - Penicillin V (or clindamycin) for 10 days
- **Secondary prevention:**
    - Penicillin V 250 mg BD PO **or**
    - Sulfadiazine 1 gm daily (0.5 g if < 30kg)
    - Erythromycin 250 mg BD (if penicillin allergic)

  We use benzibiiotic (benzathine penicillin)

  Duration:
    - Carditis + Persistent valvular disease:

    - at least age of 40 years (sometimes lifelong)
  - Carditis but no valvular disease:
    - for 10 years
  - No carditis:
    - 5 years prophylaxis until age of 21

LEFT ATRIAL MYXOMA

Common primary tumor of heart, usually benign, may be pedunculated, polypoid, gelatinous. May be sporadic or familial. It occurs in any age (3 - 6th decade).

▶ SITES OF ORIGIN

- Left atrium 75% cases
- Right atrium
- Ventricles rarely

▶ CLINICAL FEATURES

- **Obstructive features:** syncope or vertigo; clinical signs like MS but vary with posture, tumor plop.
- **Embolic features:** systemic or pulmonary embolism
- **Constitutional features:** PUO, malaise, weight loss, clubbing

▶ INVESTIGATIONS

- **CBC:** Anaemia, high ESR
- **Hypergammaglobulinemia**
- **CXR:** may be similar to MS
- **Echocardiogram:** 2D or transoesophageal
- **CT scan or MRI**

▶ TREATMENT

- Surgical excision (remember recurrence)

2. Mitral regurgitation

CASE PRESENTATION:

I have examined this gentleman,

- **His**
  - Pulse is between 70-80/min, regular (or irregular), low volume, no radio-radial or radio-femoral delay.
  - BP is 100/80 mmHg
  - JVP is not raised
  - There are no scar marks in the chest (lateral thoracotomy scar may be present)
- **Apex beat** is displaced (may be un-displaced) and thrusting in character (may not be thrusting)
- **On auscultation**
  - 1st Heart sound is soft and there is wide splitting of 2nd heart sound (A_2P_2) due to the earlier closure of A2 as LV empties sooner.
  - There is a pan-systolic murmur at the apex which becomes louder in expiration and radiates to the axilla (may radiate to left sternal edge towards aortic root if it is due to posterior papillary muscle rupture)
  - 3rd heart sound (may be present as well)
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is Mitral regurgitation.

Differential diagnosis

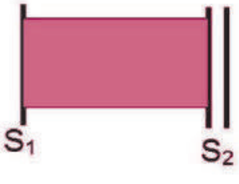
- **VSD:** systolic thrill & pansystolic murmur in left parasternal area (4th or 5th ICS), no radiation.
- **TR:** best heard in the tricuspid area at the left lower sternal edge during inspiration and sound radiates up along the left sternal border. JVP raised with prominent V waves, enlarged tender pulsatile liver.

Note: If Pulmonary HTN then following may also be present

- Raised JVP
- Left parasternal heave and thrill
- Pulmonary component of the S_2 may be palpable and loud as well
- There is another pansystolic murmur at the left lower sternal edge that becomes louder on inspiration
- There may be early diastolic Graham-Steel murmur of pulmonary regurgitation as well which becomes louder in inspiration

Remember:

- **High pitched hollow pansystolic murmur (blowing in character)** with constant intensity from S1 to S2.
- **Radiation:**
  - Rupture of anterior leaflet of chorda tendineae: radiation to axilla and back
  - Rupture of posterior leaflet of chorda tendineae: radiation to cardiac base and carotid arteries.



Holosystolic mumur

DISCUSSION

▶ CAUSES (MNEMONIC — MRCP C MIST)

- **Chronic:** Mnemonic — MRCP C
  - ***Mitral valve prolapse***
  - ***Rheumatic***
  - ***Connective tissue disease:*** RA, ankylosing spondylitis

  - ***Papillary muscle dysfunction***
    - Dilated LV: Functional MR due to mitral annular dilatation
    - ischaemia
  - ***Congenital:*** parachute valve, endocardial cushion defect (including primum ASD and cleft mitral leaflet), corrected transposition.
- **Acute:** Mnemonic — MIST
  - ***MI:*** chordae rupture or papillary muscle dysfunction
  - ***Infective endocarditis:*** perforation of anterior leaflet
  - ***Surgery***
  - ***Trauma***

▶ CLINICAL SIGNS OF SEVERITY

- **Pulse:** Small volume
- **Apex beat:** displaced (enlarged LV)
- **Soft S_1**
- **Widely split S_2** aortic component of 2nd heart sound is earlier (mnemonic MR Wide)
- **3rd heart sound** (Kentucky)
- **Early diastolic rumble**
- **Pulmonary hypertension**
  - Prominent 'a' wave in JVP
  - Left parasternal heave, epigastric pulsation (indicates RVH)
  - Palpable P_2
  - Loud P_2 on auscultation
  - Early diastolic murmur (Graham Steel murmur due to pulmonary regurgitation)
  - Functional TR

▶ INVESTIGATIONS

- **ECG:**
  - AF
  - P-mitrale (broad bifid in sinus rhythm)
  - Previous infarction (Q waves)
- **CXR**
  - Cardiomegaly
  - Enlargement of left atrium (double left atrial shadow, displaced left main bronchus with splayed carina, big left atrial appendage)
  - Pulmonary edema
    - Upper lobe blood diversion: upper lobe veins are dilated (early feature). Normally, ratio between upper and lower lobe veins is 1:3, which is altered to 1:1.
    - Kerley's B lines: horizontal septal lines in costophrenic angle, which indicates pulmonary hypertension.
    - Mottling or reticulonodular shadow due to pulmonary hemosiderosis.
  - Calcified mitral valve (best seen in fluoroscopy)
- **Echocardiography**
  - Left atrial size
  - LV dilatation
  - Reduced EF
  - Size/density of MR jet in left atrium on Doppler

  CAUSE: prolapse, vegetations (thickened leaflet —rheumatic etiology), ruptured papillae, fibrotic restriction and infarction

▶ MANAGEMENT

- **Medical**
  - ***AF:***
    - β-blocker
    - Oral anticoagulation

    - *Diuretics*
    - *ACE inhibitors*
- **Percutaneous:** mitral clip device for palliation in inoperable cases of mitral valve prolapse
- **Surgery:**
    - ***Valve repair:*** (preferable) with annuloplasty ring or replacement
      INDICATIONS:
        - Symptomatic (NYHA III, IV)
        - Prior to severe LV dilatation and dysfunction (EF <55%, LV ESD >45 mm)

▶ PROGNOSIS

- Asymptomatic latent phase >10 years
- Symptomatic – 25% mortality at 5 years

3. Mixed Mitral Valve Disease

CASE PRESENTATION 1: Predominant MR

Well, I have examined this gentleman,

- **His**
  - Pulse is regular (or irregular) and small volume; BP is 120/80 mmHg with normal pulse pressure and
  - JVP is not raised
  - There are no scar marks in the chest
- Apex beat is displaced and thrusting in character.
- **On auscultation**
  - There is a pan-systolic murmur at the apex which becomes louder in expiration and radiates to the axilla
  - There is also a mid-diastolic rumbling murmur at the apex with presystolic accentuation, heard best in expiration with the patient in left lateral position with the bell of stethoscope
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is mixed mitral valve disease and the predominant lesion is mitral regurgitation.

CASE PRESENTATION 2: Predominant MS

Well, I have examined this gentleman,

- **His**
  - Pulse is between 70-80/min, irregularly irregular, and is of variable volume (low volume if regular), no radio-radial or radio-femoral delay.
  - BP is 100/80 mmHg with narrow pulse pressure
  - JVP is not raised
  - There are no scar marks in the chest.
- **Apex beat** is un-displaced and tapping in character.
- **On auscultation**
  - There is a mid-diastolic rumbling murmur at the apex with presystolic accentuation, heard best in expiration with the patient in left lateral position with the bell of stethoscope
  - There is also pan-systolic murmur at the apex which becomes louder in expiration and radiates to the axilla
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is **mixed mitral valve disease and the predominant lesion is mitral stenosis**

  Other possibilities include
  - **AS+MR (Functional MR)** in this case all the peripheral signs will be that of AS i.e low volume pulse and heaving and un-displaced apex beat
  - **AR and MR** both cause volume overload and high-volume pulse but if the pulse is regular and there is high systolic pressure with wide pulse pressure it favours AR as the predominant lesion
  - **AR and AS** with MS in this case if MS is severe then it will mask the features of AS and AR but if there is severe AS or AR with MS, there will be peripheral features of Aortic valve disease which means MS will not be severe in that case

4. Mitral Valve Prolapse

CASE PRESENTATION:

Well, I have Examined this gentleman,

- **His**
  - Pulse is between 70-80/min, regular (or irregular), good volume, no radio-radial or radio-femoral delay
  - JVP is not raised and
  - There are no scar marks in the chest
- **Apex beat** is un-displaced and normal in character
- **On auscultation**
  - 1st and 2nd heart sound are normal.
  - There is a mid-systolic click (can be multiple) and soft high-pitch mid to late systolic murmur radiating to axilla (dynamic and becomes quieter on squatting and increases on standing). if posterior leaflet is involved the murmur radiates up the sternal edge.

    Murmur is accentuated by standing from a squatting position or during the straining phase of the Valsalva manoeuvre, which reduces the flow of blood through the heart.
- **However, He does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is mitral valve prolapse

Differential Diagnosis

- AS
- Pulmonary stenosis
- HOCM

Note: It can convert into MR and all the symptoms and signs accordingly

DISCUSSION

It affects 5-10% of the population.

▶ CLINICAL FEATURES

Often asymptomatic but may present with atypical chest pain in the left submammary region, syncope and palpitations.

▶ ASSOCIATIONS MNEMONIC - HAM

- ASD (secundum) in 20 % cases
- Marfan's syndrome, Ehler-Danlos syndrome
- Hypertrophic cardiomyopathy

▶ COMPLICATIONS

- MR
- Infective endocarditis
- Arrhythmias
- Embolism
- Sudden death

▶ MANAGEMENT

- **Beta-blocker** (bisoprolol)
- **MVR:** in severe MR with LV dysfunction.
- **Echocardiography** every 2-3 years

Endocarditis prophylaxis is not required as per NICE guidelines.

5. Aortic regurgitation

CASE PRESENTATION:

Well, I have examined this gentleman,

- **His**
  - Pulse is between 70-80/min, regular, good volume, collapsing in character.
  - BP is 120/ 50 mmHg with wide pulse pressure with high systolic and low diastolic components
  - There are prominent arterial pulsations in the neck (Corrigan's sign) but JVP is not raised.
  - No scar mark in the chest.
- **On palpation,**
  - Apex beat is displaced and thrusting in character.
  - There is a diastolic thrill in the left parasternal area.
- **On auscultation**
  - 1st Heart sound is normal, and the 2nd heart sound is soft (may be normal). Aortic component only while P2 is normal.
  - There is an **early diastolic murmur** blowing in character at the left sternal edge that becomes louder with the patient sitting forward and with the breath held in expiration.
  - Also mention if present, the ejection systolic murmur in aortic area radiating to the neck due to increased stroke volume and flow through the aortic valve. A soft diastolic murmur (Austin Flint murmur).
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor.
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

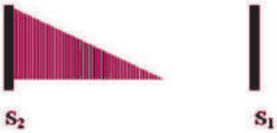
- My most likely diagnosis is aortic regurgitation (AR)

Differential Diagnosis

- Pulmonary regurgitation (murmur in pulmonary area, loud on inspiration)

Remember:

- **Bounding pulse or wide pulse pressure**
- **Early diastolic decrescendo murmur** best heard in the 3rd or 4th left intercostal space patient sitting and leaning forward with breath held in expiration.
- **Reverse splitting of second heart sound** in expiration (normal splitting A2P2 in inspiration)



Note: A loud systolic murmur, rarely with a thrill, may be present without any organic aortic stenosis. The peripheral signs of aortic incompetence are the clue that this is the real lesion in this situation.

Look for following in the eye & mouth in AR

- **Eye:** Argyll Robertson pupil (may be present in neurosyphilis), dislocated lens, irregular pupils iridodonesis (found in Marfan's syndrome)
- **Mouth:** High arched palate (Marfan's syndrome).

DISCUSSION

▶ CAUSES

- **Chronic AR:** Mnemonic — RCS MADE (Royal College of Surgeons MADE)
  - ***Valvular***
    - Rheumatic
    - Congenital: bicuspid valve, VSD due to an associated prolapse of the aortic cusp
    - Seronegative spondyloarthropathy: especially ankylosing spondylitis
  - ***Aortic Root*** Murmur may be maximal at the right sternal border.
    - Marfan's syndrome
    - Aortitis: seronegative arthropathies, RA, tertiary syphilis

        - Dissecting aneurysm
        - Elderly
- **Acute AR:** Murmur may be soft because of increased left ventricular end-diastolic pressure.
    - ***Valvular***
        - Infective endocarditis
    - ***Aortic Root***
        - Marfan's syndrome
        - Hypertension
        - Dissecting aneurysm

CLINICAL SIGNS OF SEVERITY

- **Pulse:** Collapsing pulse (water hammer pulse)
- **BP:** Wide pulse pressure.
- Soft aortic component of the second heart sound (A2).
- **3rd heart sound (left ventricular)**
- **Murmur:** Length of the decrescendo diastolic murmur.
- **Austin Flint murmur** due to regurgitant flow impeding mitral opening.
- **LVF / pulmonary edema**

EPONYMOUS SIGNS

- **Quincke's:** nail bed capillary pulsation
- **Corrigan's:** visible carotid pulsation
- **De Musset's:** head nodding
- **Mueller's sign:** pulsation of uvula with heartbeat
- **Duroziez's:** diastolic murmur proximal to femoral artery compression
- **Traube's:** 'pistol shot' sound over the femoral arteries

INVESTIGATIONS

- **ECG:** LVH, lateral T wave inversion
- **CXR:** cardiomegaly, widened mediastinum and pulmonary oedema
- **Echocardiography**
    - *Severity:* LV EF and dimensions, aortic root size, regurgitant jet width
    - *Cause:* intimal dissection flap or vegetation
- **Cardiac catheterization:** to grade the severity, aortogram and check coronary patency

MANAGEMENT

- **Medical:**
    - ***ACEI and ARBs:*** reduce afterload
    - ***Regular follow and review*** (for symptoms & Echocardiography): In regurgitant murmurs, patient tend to be relatively asymptotic till later on the course of disease so regular annual echo follow up required.
        - LVEF, LV size and degree of AR
- **Surgery:**

  INDICATIONS:
    - ***Acute:*** Dissection & Aortic root abscess/endocarditis
    - ***Chronic:***
        - Symptomatic: Syncope, exertional angina, dyspnoea NYHA class III or IV
        - Prior to severe LV dilatation and dysfunction (EF <50%, LV ESD >55 mm, LVEDD >75 mm, aortic root dilation >50 mm (ACC / AHA guidelines)
        - Moderate AR, undergoing CABG or surgery involving ascending aorta.

PROGNOSIS

- Asymptomatic with EF > 50% – 1% mortality at 5 years.
- Symptomatic and all three criteria present – 65% mortality at 3 years.

OTHER CAUSES OF COLLAPSING PULSE

- Pregnancy
- Anaemia
- Thyrotoxicosis
- PDA
- Paget's disease

LVEDP greater than 20 mmHg is suggestive of irreversible LV dysfunction.

6. Aortic stenosis

CASE PRESENTATION:

Well, I have examined this gentleman,

- **His**
  - Pulse is between 70-80/min, regular, low volume and slow rising, no radio-radial or radio-femoral delay
  - BP revealed narrow pulse pressure
  - JVP is not raised, and
  - There are no scar marks in the chest.
- **On palpation,**
  - Apex beat is un-displaced and heaving in character (pressure Loaded)
  - Thrill in aortic area (right sternal edge, second intercostal space)
- **On auscultation**
  - 1st heart sound is normal, and the 2nd heart sound is soft (A2 may be soft and P2 is normal; may be reverse splitting of S_2 - splitting during expiration instead of inspiration)
  - There is a harsh ejection systolic murmur heard throughout the precordium but best audible in the aortic area that becomes louder in expiration and radiates to the carotids.
  - S_4
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor.
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, Based on this,

- My most likely diagnosis is Aortic Stenosis

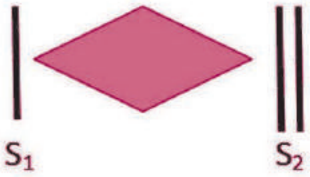
Differential Diagnosis:

- **Pulmonary stenosis:** murmur best heard in pulmonic area and doesn't not radiate to carotids becomes louder on inspiration and pulse is normal.
- **HOCM:** Murmur of HOCM increases with decreased Left ventricular filling like standing but murmur of aortic stenosis decreases on standing. Pulse is jerky, double impulse at apex.
- **VSD**
- **Aortic sclerosis:** normal pulse character and no radiation of murmur. Thickening and/or calcification of aortic valve without significant obstruction. There may be an ejection systolic murmur but no peripheral features until quite advanced then it may act like aortic stenosis
- **Aortic flow**: high output clinical states e.g. pregnancy or anaemia

Remember:

- **Slow rising pulse:** may not be found in elderly due to stiffening of arteries.
- **S_2:** may be absent in severe aortic stenosis.
- **Ejection systolic click:** preceded by the murmur due to opening of stenosed valve. May be present in young patients with bicuspid aortic valve but not in elderly with calcified aortic valves.
- **Crescendo-Decrescendo (diamond shape) harsh ejection systolic murmur**
  - Loudest in aortic area (along right sternal border in 2nd ICS)
  - Radiates to upper sternum, sternal notch & neck; and carotid arteries.

    (murmur may be heard at the apex — Callavardin phenomenon but without radiation to the axilla which is important point in differentiating it from MR)



Crescendo decrescendo murmur

- **Pulsus parvus et tardus:** In significant AS, carotid upstroke is delayed and decreased which differentiates it from innocent systolic murmurs. This is known as "pulsus parvus et tardus" refers to a weak (parvus) and delayed (tardus) carotid upstroke. To asses for "parvus," it is often helpful to palpate one's own carotid artery while concurrently palpating the patient's carotid artery. It is important to note that in some elderly individuals, the carotids may be stiff due to calcification, which may falsely normalize the carotid upstroke. To assess for "tardus," auscultate the patient's S2 heart sound while palpating their carotid upstroke. The S2 and carotid upstroke should occur almost simultaneously. If the carotid upstroke comes significantly after the S2 heart sound, "tardus" is present, indicating severe AS.

DISCUSSION

▶ SEVERITY OF MITRAL STENOSIS:

(Normal aortic valve area 3 - 4 cm²)

Severity of aortic stenosis	Severity valve area (cm)	Mean gradient (mmHg)
Mild	> 1.5	< 25
Moderate	1.0 - 1.5	25 - 50
Severe	< 1.0	> 50
Critical	< 0.7	> 80

Systolic gradient across the aortic valve = LV systolic pressure - aortic systolic pressure

Severe LV dysfunction result in falsely low valve area calculation: (low cardiac output reduces the valve opening forces resulting in misinterpretation into critical aortic stenosis). Assess haemodynamic after increasing the cardiac output by dobutamine infusion during echocardiography or cardiac catheterisation. Patients with truly severe AS manifest an increase in transaortic pressure gradient while the valve surface area remains the same during dobutamine infusion; while those with falsely low calculated valve area manifest an increase in calculated valve surface area.

Dobutamine echocardiography is also important to assess LV contractile reserve. Patients who have 20% or more increase in stroke volume after dobutamine infusion have a much better prognosis after surgery compared to those who do not have LV contractile reserve.

An overestimation of the severity of aortic stenosis when assessed by echocardiography can occur in aortic regurgitation due to large volumes of blood passing over the valve at high velocities.

▶ CAUSES MNEMONIC RCD — RED CELL DISTRIBUTION

- **Rheumatic**
- **Congenital bicuspid valve** (in young)
- **Degenerative senile calcific aortic stenosis** (commonest cause in elderly)

▶ TYPES OF AORTIC STENOSIS

- **Valvular:** Involving valve cusps. It is the most common type.
- **Subvalvular:** Narrowing of outflow tract of left ventricle.
- **Supravalvular:** Constriction at the first part of aorta. rare

▶ CLINICAL SIGNS OF SEVERITY

- **Plateau Pulse:** slow rising, small volume pulse (pulsus parvus). It may be late peaking (pulsus tardus).
- **Aortic thrill:** very important sign of severe stenosis
- **Length and lateness of the peak of the systolic murmur**
  as long as the cardiac output is maintained; however, when heart failure develops and cardiac output declines, the murmur becomes softer. Thus, the intensity of the murmur is not a good indicator of disease severity.
- **Fourth heart sound**
- Paradoxical splitting of the S_2 (reverse splitting - splitting in expiration)
- LVF (a late sign - RVF is preterminal)

  ADVERSE PROGNOSTIC FEATURES:

  The onset of symptoms and EF $\leq$ 40% are the most prominent adverse prognostic features.

▶ INVESTIGATIONS

- **ECG:** LVH on voltage criteria, conduction defect (prolonged PR interval)
- **CXR:** often normal; calcified valve
- **Echocardiography:** mean gradient >50 mm Hg aortic (valve area <1.0 cm2) if severe
- **Cardiac catheterization:** invasive transvalvular gradient and coronary angiography (CAD often coexists with aortic stenosis)

▶ MANAGEMENT

- **Asymptomatic**
  - Regular review: symptoms and echo to assess gradient and LV function
- **Symptomatic**
  - ***Surgical:*** Aortic valve replacement +/− CABG

    INDICATIONS:
    - Symptoms: exertional syncope, angina or dyspnoea
    - Valve gradient $\geq$ 50 mmHg
    - Critical obstruction and severe LVH even if asymptomatic
    - Moderate obstruction in patient undergoing CABG or other valve replacement

    REMEMBER: perform coronary angiography prior to aortic valve replacement to ascertain concomitant CAD, which if present then simultaneous CABG and valve replacement should be done.
  - ***Percutaneous***
    - **Percutaneous balloon aortic valvuloplasty (BAV):** used in acutely unwell patient as a bridging procedure.
    - **Transcutaneous aortic valve implantation (TAVI):** Transfemoral (or transapical and transaortic). May be recommended if high surgical risk or inoperable.

Preferred anaesthesia in critical aortic stenosis

As cardiac output is relatively fixed in critical aortic stenosis, a spinal anaesthesia will be a risky procedure due to profound, uncontrolled and autonomic blockade. A cardiostable general anaesthetic technique with appropriate invasive monitoring is more titratable and will be a safer option.

Congenital bicuspid aortic valve and pregnancy

Symptomatic young woman wishing to become pregnant should have aortic valve replacement with porcine valve before pregnancy (presence of metallic valve will require warfarinization which is teratogenic in early pregnancy and not advised in late pregnancy due to risk of haemorrhage, and therefore require switching to LMWH.

HYEDE'S SYNDROME

Heyde syndrome is a triad of

- Aortic stenosis
- Acquired coagulopathy: Destruction of von Willebrand's factor as the platelets traverse the stenosed valve
- Anaemia due to bleeding from intestinal angiodysplasia

▶ INVESTIGATIONS

- **Mesenteric angiography:** to look angiodysplasia which are not visible on colonoscopy

▶ TREATMENT

- Aortic valve replacement
- Resection of the diseased bowel

Resolution of anaemia usually follows aortic valve replacement.

Remember: valve haemolysis associated with prosthetic valve due to mechanical destruction of red cells leading to anaemia (macrocytic) with increased retics and decreased haptoglobulins and increased unconjugated bilirubin.

DUKE'S CRITERIA FOR INFECTIVE ENDOCARDITIS

Major:

- Typical organism in two blood cultures
- Echo: abscess*, large vegetation*, dehiscence*

Minor:

- Atypical organism on blood culture
- Echo suggestive
- Pyrexia >38°C
- Predisposed, e.g. prosthetic valve
- Embolic phenomena*
- Vasculitic phenomena (ESR↑, CRP↑)

Diagnose if the patient has 2 major, 1 major and 2 minor, or 5 minor criteria.

(*plus heart failure/refractory to antibiotics/heart block are indicators for urgent surgery).

Antibiotic prophylaxis is now limited to those with prosthetic valves, previous endocarditis, cardiac transplants with valvulopathy and certain types of congenital heart disease.

7. Mixed aortic valve disease

CASE PRESENTATION 1: Predominant AR

Well, I have examined this gentleman,

- **His**
  - Pulse is of good volume and regular
  - JVP is not elevated.
  - There are no scar marks in the chest.
- **Apex beat** is displaced and thrusting in character.
- **On auscultation**
  - There is an early diastolic murmur at the left lower sternal edge which becomes louder on sitting and leaning forward and in expiration.
  - There is also an ejection systolic murmur heard throughout the precordium but best audible in the aortic area which becomes louder in expiration and radiates to the carotids.
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is mixed aortic valve disease and the predominant lesion is aortic regurgitation.

CASE PRESENTATION 2: Predominant AS

Well, I have examined this gentleman,

- **His**
  - Pulse is of low volume and regular
  - JVP is not elevated and
  - There are no scar marks in the chest.
- **Apex beat** is un-displaced (minimally displaced) and heaving in character
- **On auscultation**
  - There is an ejection systolic murmur heard throughout the precordium but best audible in the aortic area which becomes louder in expiration and radiates to the carotids.
  - There is also an early diastolic murmur at the left lower sternal edge which becomes louder on sitting and leaning forward and in expiration
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis is mixed aortic valve disease and the predominant lesion is aortic stenosis.

Other possibilities include

1. **AS+MR (Functional MR)** in this case all the peripheral signs will be that of AS i.e. low volume pulse and heaving and un-displaced apex beat.
2. **AR and MR** both cause volume overload and high-volume pulse but if the pulse is regular and there is high systolic pressure with wide pulse pressure it favours AR as the predominant lesion.
3. **AR and AS** with MS in this case if MS is severe then it will mask the features of AS and AR but if there is severe AS or AR with MS, there will be peripheral features of Aortic valve disease which means MS will not be severe in that case

8. Ventricular Septal Defect

CASE PRESENTATION

Well, I have examined this gentleman

- **His**
  - Pulse is regular and is of normal volume
  - JVP is not raised and
  - There are no scar marks in the chest
- **Apex beat** is undisplaced and normal in character (If there is a small defect) but may be displaced and thrusting if significant VSD
- **On palpation,**
  - There is evidence of parasternal thrill
- **On auscultation**
  - 1st and 2nd Heart sounds are normal (2nd may be obscured)
  - There is a loud Pan-systolic murmur which is heard throughout the precordium but loudest at the left lower sternal edge
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- Most likely diagnosis is VSD with left to right shunt.

If large defect and significant Left to Right shunting

- Pulmonary HTN develops and it leads to a Loud P2 and the pan-systolic murmur of VSD will become quieter.
- As pulmonary HTN increases there may be reversal of shunt from right to left and the development of Eisenmenger's Syndrome. In this situation, ventricular pressures will equalize and there will be a single Loud 2nd Heart sound and the VSD related murmur will disappear.

Differential Diagnosis

- MR
- TR

DISCUSSION

Common site of VSD is the peri-membranous part of interventricular septum (in 90% cases).
VSD may be associated with Turner's syndrome, Down's syndrome or maternal rubella during pregnancy.

▶ CAUSES

- **Congenital:** most common congenital heart disease
- **Acquired:** rupture of interventricular septum after acute MI, rarely trauma.

▶ TYPES OF VSD

- **Small VSD (maladie de Roger):** asymptomatic and usually closes spontaneously but there is a future risk of development of AR or endocarditis even after spontaneous closure. The systolic murmur is loud and prolonged.
- **Moderate VSD:** The patient presents with fatigue and dyspnea. Heart is usually enlarged with a prominent apex beat. There is often a palpable systolic thrill and a loud "tearing" pansystolic murmur at the left lower sternal edge.

- **Large VSD:** The murmur is soft. It may lead to pulmonary hypertension and Eisenmenger's complex. When Eisenmenger's syndrome develops, there is cyanosis, clubbing and evidence of pulmonary hypertension. Pansystolic murmur may disappear, because of equalization of pressure in right and left ventricle.

MANAGEMENT

- **Small VSD:** Surgery not needed; only follow-up. Spontaneous closure may occur in infants if it is in the muscular part. Prophylactic penicillin for SBE may be given.
- **Moderate to large:** Surgical correction is needed if pulmonary to systemic flow ratio >1.5:1. Percutaneous transcatheter closure may be done.
- **When Eisenmenger's syndrome develops:** Surgery contraindicated as it aggravates right sided heart failure. Following treatments are given:
    - Diuretic
    - Digoxin in some cases
    - Venesection if polycythemia
    - Heart lung transplantation. Mortality rate is very high than heart transplantation alone.

COMPLICATIONS

- Infective endocarditis
- Pulmonary hypertension with reversal of shunt (Eisenmenger's syndrome)
- Heart failure

CAUSES OF PLETHORIC LUNG FIELD

- ASD
- VSD
- PDA
- Congestive cardiac failure

9. Valve Replacement

CASE PRESENTATION 1: Mitral Valve Replacement

I have examined this gentleman,

- **His**
  - Pulse is normal and is of good volume (may be irregularly irregular)
  - JVP is not raised and
  - There is a midline sternotomy scar in the chest and 2 more scars in the upper abdomen.
- **Apex beat** is undisplaced and normal in character
- **On auscultation**
  - There is a prosthetic click that coincides with 1st Heart sound and 2nd Heart sound is normal
  - Diastolic flow murmur (MDM) may be present normally
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this

- My most likely diagnosis for this gentleman is mitral valve replacement which is functioning very well.

CASE PRESENTATION 2: Aortic Valve Replacement

I have examined this gentleman,

- **His**
  - Pulse is regular and is of good volume
  - JVP is not raised
  - There is a mid-line sternotomy scar in the chest and two more scars in the upper abdomen.
- **Apex beat** is un-displaced and normal in character
- **On auscultation**
  - 1st Heart sound is normal but there is a prosthetic click that coincides with the 2nd heart sound.
  - Ejection systolic flow murmur may be present normally.
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor
  - There are no signs of heart failure as
    - Lungs are clear to auscultation on both sides, and
    - There is no edema

So, based on this,

- My most likely diagnosis for this gentleman is aortic valve replacement which is functioning very well.

CASE PRESENTATION 3: Dual Valves Replacement

I have examined this gentleman,

- **His**
  - Pulse is regular and is of good volume
  - JVP is not raised and
  - There is a midline sternotomy scar in the chest and two more scars in the upper abdomen.
- **Apex beat** is un-displaced and normal in character
- **On auscultation**
  - There are prosthetic clicks which coincide with 1st and 2nd Heart sounds
- **However, he does not have**
  - Peripheral stigmata of infective endocarditis and pallor

- There are no signs of heart failure as
  - Lungs are clear to auscultation on both sides, and
  - There is no edema

So, based on this,

- My most likely diagnosis for this gentleman is dual i.e. mitral and aortic valves replacement which are functioning very well.

DISCUSSION ON PROSTHETIC VALVES

In metallic valve replacement, there is metallic sound on auscultation. However mechanical valve (St Jude's valve) makes softer opening and closing sound than older valves. In case of tissue valve prosthesis, there is no metallic sound or plopping sound. Rather, there is a click.

▶ TYPES OF PROSTHETIC VALVE

- **Metallic valves:**
  - Starr-Edward valve (ball-cage valve) mostly used
  - Bjork-Shiley valve (tilting disc)
  - St Jude's valve (bi-leaflet, double tilting disc)
- **Tissue valves:**
  - Carpentier-Edwards valve
  - Hancock porcine valve
  - Ionescu Shiley valve (less used).

Types of Tissue valve

- Xenograft: made from porcine valve or bovine pericardium, less durable and may require replacement after 8 to 10 years. Anticoagulation is not required unless there is AF.
- Homograft: cadaveric valves (aortic or pulmonary human valve), particularly useful in young patient and in the replacement of infected valves.

▶ PROSTHETIC VALVE LEAKING

- **Mitral valve:** Appearance of pan-systolic murmur (PSM). Consider any systolic murmur of loud intensity to be a sign of regurgitation and failure of the valve. (MDM may be normally present)
- **Aortic valve:** Appearance of early diastolic murmur (EDM). Ejection systolic murmur ESM may be normally present as all types of valves produce a degree of outflow obstruction and thus have an ESM).

Prosthetic valve dysfunction

- Absence of opening and clicking or closing sounds indicates dysfunction.
- Unexplained heart failure may be due to dysfunction. Biological valve dysfunction is usually associated with regurgitant murmur.

▶ ADVANTAGES AND DISADVANTAGES OF DIFFERENT VALVES

Metallic valve:

ADVANTAGES

- More durable, less incidence of valve failure

DISADVANTAGE

- Life-long anticoagulation required due to high risk of thrombosis
- Microangiopathic hemolytic anemia

Tissue valve:

ADVANTAGE

- Long term anticoagulation not required due to less risk of thrombosis (if no AF)
- No haemolysis.

DISADVANTAGE

- Less durable due to stiffening and later tearing of valve leaflets over 10 years requiring repeat valve replacement. There is degeneration and calcification in advanced stage.

▶ COMPLICATIONS

Metallic valve:

- Thromboembolism
- Bleeding secondary to anticoagulation
- Microangiopathic haemolytic anaemia
- Infective endocarditis

Tissue valve:

- Primary valve failure
- Perforation or rupture
- Degenerative changes
- Calcification
- Infective endocarditis

Complications of prosthetic valve

- **Thromboembolism**: Anticoagulation is necessary (INR should be between 3 and 4.5)
- **Primary valve failure**: common in tissue valve.
- **Valve leaking**
- **Dehiscence** or detachment of valve from the site or valve ring resulting in paraprosthetic leak.
- **Valve obstruction by thrombosis or calcification**
- **Mechanical or microangiopathic haemolytic anaemia** (mainly in aortic valve in 10 to 20% in 10 years. Occurs due to metallic valve).
- **Perforation, rupture, degenerative changes** due to calcium depositions (tissue valve)
- **Infective endocarditis,** especially in dental procedure or catheterisation Common organism is Staphylococcus epidermidis, Occasionally, treatment may be difficult, high mortality and may require replacing the valve again. If infection occurs within 60 days of valve replacement (early) it is mostly by contamination of intravenous (IV) cannula and if the infection occurs after 60 days (late), it is like other valve endocarditis.

Remember:

- Ball and cage valve causes haemolysis more than other valve
- Tilting disc is more thrombogenic

▶ CHOOSING A VALVE

- In young patients, if no contraindication for anticoagulant therapy, metallic valve prosthesis is preferred. In elderly patient or if there is contraindication to anticoagulant therapy, tissue valve prosthesis is preferred.
- In woman at childbearing age mechanical valves are now preferred. During pregnancy, warfarin is substituted with IV unfractionated heparin in the first 6 to 12 weeks and last 2 weeks. This is associated with a low rate of warfarin embryopathy and of bleeding.
- However, subcutaneous heparin and low molecular weight heparin are not recommended at the present.
- Recent studies have showed that women who need low doses of warfarin (5 mg or less) are at low risk for fetal warfarin embryopathy, bleeding, still birth or abortion. In these women, warfarin may be given throughout pregnancy but should be closely monitored.
- Previously tissue valve was used for young woman considering the risk of anticoagulation at pregnancy, but with tissue valve, there is increased risk of early structural valve deterioration (SVD) during or shortly after the end of pregnancy. In addition, tissue valve is less durable and repeat valve replacement may be needed after about 10 years.

B. NEUROLOGY SHORT CASES

I. CRANIAL NERVES: EXAMINATION

II. UPPER LIMB: NEUROLOGICAL EXAMINATION

III. LOWER LIMB: NEUROLOGICAL EXAMINATION

IV. CASE PRESENTATION

I. Cranial nerves: Examination

Introduction & consent

"Hello, my name is Dr __________. I would like to examine the nerves of your face, is that ok? ...... Right."

1. Cranial nerve I: olfactory

Not routinely tested unless the patient complains of a loss of sense of smell (anosmia) and exhibits other signs suggestive of a frontal or temporal lobe cause (e.g. tumour).

- *"Do you have any problem with your sense of smell?"*

2. Cranial nerve II: Optic

Visual acuity

- *"Do you wear glasses?"*
  - **Far vision:** *"Please cover your right eye with your right hand. Now look at the wall clock. What's the time? ...... Now cover your left eye with your left hand... Look again at the wall clock. What is the time?"*
  - **Near vision:** *"Can I ask you to cover your left eye with your left hand... Now look at my face. Can you see it clearly? ...... Can you swap eyes for me? ... Now look again at my face ... Can you see it clearly?"*

Distant and near vision can be tested together instead of asking the patient to swap the eyes repeatedly.

Visual fields (confrontation method)

- **Both eyes:** *"Now keep your head still and look directly into my eyes ... Please tell me when you see my finger moving."*
- **Right eye:** *"Cover your left eye with your left hand ... Fix your gaze at my eye and keep your head still ... Say me yes once you see my fingers wiggling coming in."* Sit directly in front of the patient about one meter away. Compare with your own visual fields. Cover own opposite eye with the gaze fixed at patients' eye. Test each quadrant one by one.
- **Left eye:** *"Now swap eyes for me and fix your gaze at my eye with your head still ... Say yes once you see my fingers wiggling coming in."* Sit directly in front of the patient about one meter away. Compare with your own visual fields. Cover own opposite eye with the gaze fixed at patients' eye. Test each quadrant one by one.

Perimetry testing is not done in exam setting.

Pupils

- Look for size, shape, symmetry
- **Light reflex:** *"Can you please put your hand over your nose like this? ... I am going to shine light into your eyes."*
  - **Direct light reflex:** Shine a torch in each eye and observe the pupil reaction in that eye.
  - **Consensual light reflex:** Shine a torch into one eye and observe the pupil reaction in the other eye.
  - **Relative afferent pupillary defect (RAPD):** Swinging light test
    - Swing the light into each eye from side to side. Keep the beam of light on the first eye for at least 3 seconds to allow the pupil size to stabilise. Note the pupil of the eye being illuminated reacts briskly and constricts fully to the light. Also note what happens to the pupil of the other eye: does it also constrict briskly?
    - Move the light quickly to shine in the other eye. Again, hold the light steady for 3 seconds. Note whether the pupil being illuminated stays the same size, or whether it gets bigger. Note also what happens to the other eye.
    - When the light is shone into the eye with the retinal or optic nerve disease, the pupils of both eyes will constrict, but not fully because of a problem with the afferent pathway. When the light is shone into the other, normal (less abnormal) eye, both pupils will constrict further because the afferent pathway of this eye is intact, or less damaged than that of the other eye. When the light is shone back into the abnormal eye, both pupils will get larger, even the pupil in the normal eye. It doesn't matter whether you start with the eye you think has the greater problem or the healthier eye: as long as the light is switched from one eye to the other and back again the signs should become apparent.
- **Accommodation reflex:** *"Look at my shoulder and now at my finger."*

- ***Ophthalmoscopy:*** *"I am going to shine the light again into your eyes to look at the back of your eyes for that I have to get close to your face ... Is that ok? .... Right? ... Can you please fix your gaze here."* Perform at the end of cranial nerve examination. Locate a distant point for gaze fixation by throwing light of ophthalmoscope. Darken the room. Focus the lens on the optic disc (pale? swollen?). Follow vessels outwards to view each quadrant. If the view is obscured, examine the red reflex, with your focus on the margin of the pupil, to look for a cataract. Try to get a view of the fovea by asking the patient to look directly at the ophthalmoscope. Pathology here needs prompt ophthalmic review. If in doubt, ask for slit lamp examination or photography of the retina.

3. Cranial nerve III, IV & VI:

Eye movements: *"Please look at my finger and follow it while keeping your head still ... Any double vision?"* Trace an imaginary 'H'.

- **III nerve palsy:** ptosis, large pupil, eye down and out.
- **IV nerve palsy:** diplopia on looking down and in (often noticed on descending stairs). Head tilting compensates for this (ocular torticollis).
- **VI nerve palsy:** horizontal diplopia on looking out.

Nystagmus: Look also for nystagmus while the patient moves the eye with your command. Horizontal nystagmus is often due to a vestibular lesion (acute: nystagmus away from lesion; chronic: towards lesion), or cerebellar lesion (unilateral lesions cause nystagmus towards the affected side). If it is more in whichever eye is abducting, MS may be the cause (internuclear ophthalmoplegia). If also deafness/tinnitus, suspect a peripheral cause (e.g. VII nerve lesion, barotrauma, Ménière's). If it varies with head position, suspect benign positional vertigo. If it is up-and-down, ask a neurologist to review-upbeat nystagmus classically occurs with lesions in the midbrain or at the base of the 4th ventricle, downbeat nystagmus in foramen magnum lesions. Nystagmus lasting 2 beats is normal, as is nystagmus at the extremes of gaze.

4. Cranial nerve V:

Motor palsy

- *"Clinch you jaw tightly."* Feel contraction of muscles of mastication on both sides with the palms of hands (temporalis, masseter and pterygoids).
- *"Please open your mouth against my hand."* Resist opening of mouth by placing the hand underneath the chin. Jaw deviates to side of lesion.
- **Jaw jerk**

Sensory

- Check all three divisions.
- Consider corneal reflex (lost first).

5. Cranial nerve VII:

Facial nerve lesions cause droop and weakness. As the forehead has bilateral representation in the brain, only the lower two-thirds is affected in UMN lesions, but all of one side of the face in LMN lesions.

- *"Raise your eyebrows."*
- *"Close your eyes tightly and don't let me open them."*
- *"Show me your teeth."*
- *"Puff out your cheeks."*
- Taste sensation is not tested in the examination settings (anterior two-thirds of tongue is supplied by VII CN).

6. Cranial nerve VIII:

- ***Hearing:*** Ask to repeat a number whispered in an ear while you block the other. Perform Weber's and Rinne's tests.
- ***Balance/vertigo***

7. Cranial nerves IX & X:

- *"I am going to look at the back of your throat. Please open your mouth and say 'Ah'."*

In X CN lesion palate is pulled to the normal side on saying 'Ah uvula deviates away. Ask them to swallow a sip of water.

Gag reflex: *"I am going to touch the back of your soft palate with an orange stick."* The afferent arm of the reflex involves IX; the efferent arm involves X.

8. Cranial nerve XI:

Trapezii: *"Shrug your shoulders against my hands."*

Sternocleidomastoid: *"Turn your head to the left against my hand ... Now towards opposite side."* Movement is weaker opposite to the side of lesion.

9. Cranial nerve XII:

Tongue movement: *"Stick out your tongue and move it to sideways."* The tongue deviates to the side of the lesion.

"Thank you"
"It has been marvellous to examine you".

II. Upper limb: Neurological examination

Introduction & consent

"Hello, my name is Dr ___________. I would like to examine your arms, is that ok? ...... Right."

Position the patient comfortably, sitting up at 45° and with arms exposed.
The general order of examination should be Tone, Reflexes, Power, Coordination, Sensation.

1. General inspection

- Look for
    - Abnormal posturing, asymmetry
    - Muscle wasting (especially small muscles of the hand) - symmetrical/asymmetrical? Local/general?
    - Abnormal movements (fasciculation/tremor/dystonia/ athetosis)

2. Tone

- *"Do you have any pain in hands/arms/shoulders? ...... Relax and let your arms go floppy like a rag-doll."* Passively flex and extend wrist, pronate and supinate the forearm, passively flex and extend elbow & shoulder. Look for spasticity or rigidity.

3. Power

"Please copy the movements which I make and follow the commands." while you as the examiner stabilise the joint above and resist movements as appropriate to grade power. Test each muscle group bilaterally before moving on to the next position.

- *"Shrug your shoulders and don't let me push down."*
- *"Push your arms out to the side against me ...... try to pull them back in."*
- *"Hold your arms up like this and pull me towards you ...... now push me away."*
- *"Hold your hand out flat, don't let me push it down ...... now don't let me push it up."*
- *"squeeze my fingers."* Offer the patient two of your fingers.
- *"spread your fingers and stop me pushing them back together."*
- *"Grip the paper and don't let me pull it away."* Give the patient a piece of paper to grip between two fingers. You as the examiner should grip the paper with your corresponding fingers whilst asking patient to grip in between fingers tightly. Move on to next fingers to assess any weakness.

4. Reflexes

- *"Just let your arm go floppy over my arm." The patient should be relaxed and comfortable. For each reflex, test right, then left and compare both the sides.*
    - Biceps (C5,6)
    - Supinator (C6)
    - Triceps (C7)

Decide whether reflexes are absent/present (with reinforcement/normal/brisk/exaggerated).

- **Reinforcement:** *"Clench your teeth on a count of 3 but not before .... clinch .... Relax."* Strike at the count of 3. Use reinforcement if a reflex appears to be absent.

5. Coordination

- **Finger nose test:** *"Touch my finger and then your nose, with your index finger as fast as you can."* Holding your finger in front of the patient. Look for intention tremor and past pointing.
- **Test for dysdiadokokinesis:** *"Please copy the movements of my hands."* Demonstrate the patient to repeatedly pronate and supinate forearm, clapping the hands each time. Test both limbs. Failure to perform rapidly alternating movements is dysdiadokokinesis.
- **Test for pronator drift:** *"Hold your arms out in front with up-facing palms and now close your eyes."* Tap down on their up-facing palms and look for a failure to maintain supination.

6. Sensation

Spinothalamic tract

- **Light touch:** *"I am going to touch you with cotton, this is what it should feel like (touch it to sternum first) ...... Please say me yes when you feel it on your arms with the eyes closed ...... Did it appear same on both the sides?"* Proceed to test with cotton wool in all dermatomes. comparing left and right.
- **Pin prick:** *"I am now going to touch your arms with small pin, please say me yes when you feel it sharp with your eyes closed ...... Did it appear same on both the side?"*
- **Temperature:** no need to do in the exam

Dorsal column

- **Vibration:** *"Can you feel this vibrating (over sternum)? ...... Can you feel it? ... is it vibrating? (Right thumb tip) ...... Can you feel it, is it vibrating? (Lt thumb tip) ...... Tell me when it stops vibrating."* Using a 128Hz tuning fork confirm with patient that they can feel a buzzing when you place the tuning fork on their sternum. Proceed to test at the most distal bony prominence and move proximally by placing the buzzing fork on the bony prominence, then stopping it with your fingers. Ask the patient to tell you when the buzzing stops.
- **Joint position sense:** *"Could you look at your index finger for me? ... I am now going to move it ... This is up and this is down ... Can you close your eyes and tell me which way I am moving your index finger?"* With the patient's eyes closed grasp distal phalanx of the index finger at the sides. Stabilize the rest of the finger. Flex and extend the joint, stopping at intervals to ask whether the fingertip is up or down.

"Thank you"

Top tips

- Use the tendon hammer like a pendulum, let it drop, don't grip it too tightly.
- Ensure you are testing light touch, not stroke sensation.

III. Lower limb: Neurological examination

Introduction & consent

"Hello, my name is Dr __________. I would like to examine your legs, is that ok? ... Right."

Ask the patient to remove their lower garments down to underwear. Expose the lower limbs as much as possible with regard to patient comfort and dignity.

The general order of examination should be Gait, Tone, Reflexes, Power, Coordination, Sensation.

1. General inspection and gait

Gait:

The best way to begin examination is to ask the patient to walk across the room if he can walk as gait analysis gives more information than any other test. If limited for time, gait is the most useful test to start with. If patient is not able to walk, start with them lying down, legs fully exposed.

- *"Can you walk a few metres? ... turn ... and walk back to me."* Note use of walking aids, symmetry, size of paces, arm swing.
- **Tandem Gait:** *"Walk heel-to-toe as if on a tightrope."* To exaggerate any instability
- *"Walk on tiptoes ...... Now on heels."* Inability to walk on tiptoes indicates S1 or gastrocnemius lesion. Inability to walk on heels indicates L4,5 lesion or foot drop.
- **Romberg's test:** *"I would like you to stand unaided with arms by your sides .... close your eyes."* (be ready to support them). If patient sway/ lose balance the test is positive and indicates posterior column disease/sensory ataxia.

Inspect:

- Look for
  - Abnormal posturing, asymmetry or deformity proximally and distally
  - Foot deformity e.g. pes cavus of Friedreich's ataxia or Charcot-Marie-Tooth disease
  - Is one leg smaller than the other (old polio, infantile hemiplegia)?
- Examine for
  - Wasting, hypertrophy, fasciculation and involuntary movements. Sometimes fasciculations is elicited by flicking the skin over the wasted muscles.

2. Tone (Hypertonia and clonus suggest an upper motor neuron lesion)

"Do you have any pain in feet/legs/hips?"

- **Tone:** *"Relax and let your legs go floppy like a rag-doll."*
  - Hold the patient's knee and roll it from side to side.
  - Put your hand behind the knee and raise it quickly. The heel should lift slightly from the bed if tone is normal. Any spasticity/rigidity?

The tone can be increased or decreased, and there are various pattern of increased tone such as spasticity and rigidity.

- **Clonus:** *"Just relax again."*
  - ***Patellar clonus:*** Test the clonus of knee joint with patient relaxed and knee extended, with thumb and index finger sharply push the patella towards the foot.
  - ***Ankle clonus:*** To illicit ankle clonus, support the patient with both knee and ankle at 90 degrees, briskly dorsiflex and evert the foot sustaining the pressure.

Clonus is rhythmic series of contractions evoked by sudden stretch of the muscles. Few beats of clonus is normal in healthy individuals, but more than 5'beats' is sustained clonus and is abnormal.

3. Reflexes

Deep tendon reflexes

Test the reflexes after tone but before power as anxiety or pain can increase the response. The patient should be relaxed and comfortable. For each reflex, test right, then left and compare both the sides.

- **Knee jerk (L3, L4):** *"Just let your leg go floppy over my arm."* Strike on the patellar tendon, just below the patella.
- **Ankle jerk (L5, S1):** *"Slightly bend your knee, and drop it laterally."* Grasp the foot and dorsiflex, then strike the Achilles tendon. This is the method used in recumbent patients. If hip pain limits mobility, dorsiflex the foot with a straight leg and strike your hand, feeling for an ankle jerk.

Decide whether reflexes are absent/present (with reinforcement/normal/brisk/exaggerated).

- **Reinforcement:** *"Just interlock and clasp your hands together ...... Grip once I say you grip but not before ... Grip ... Relax."* Use reinforcement if a reflex appears to be absent. When testing the lower limbs reflexes ask the patient to interlock the fingers and pull one hand against the other. This is **Jendrassik manoeuvre**. The patient should relax between repeated attempts.
- **Plantar reflexes (L5, S1, S2):** *"Just going to run this stick up over the sole of your foot."* Run a blunt object along the lateral border of the sole of the foot towards the little toe. Normal response is flexion of the great toe and the other toes.

  Babinski's sign is positive if there is dorsiflexion of the great toe (this is abnormal (UMN lesion) if patient age >6 months).

Superficial reflexes:

- **Abdominal reflex (T8 - T12 dermatomes):** *"Now pull your vest up for me please ...... Just going to run stick across your tummy."* Use an orange stick and stroke briskly but lightly in a medial direction across each quadrant of the abdomen.
  - ***Normal response:*** contraction of the underlying abdominal muscles with movement of the umbilicus.
  - ***Absent response:*** Corticospinal tract lesion above the corresponding spinal segment. Umbilicus lies at T10 dermatome and this reflex once tested above the umbilicus check two dermatomes above the umbilicus (T8-9), and two dermatomes below the umbilicus if tested below it (T11-12).

    Absent abdominal reflex alone may not be pathognomonic. May be absent in the obese, from abdominal operations, in the very old and those who had multiple pregnancies.

4. Power

- **Hip flexion and knee extension:** *"Now lift your right leg straight up off the bed ... and down again; and same with the left leg ... and down again ...... Now lift your right leg against my hand ... and relax; and same with the left leg ... and relax."*

  Use the MRC scale to grade power from 0-5. Test the same group in isometric contraction and against the resistance.

  Hip extension: *"and now push my hands into the bed using your legs."*
- **Hip abduction:** *"Push your legs out to the sides against my hands."* Position hands on outer thighs.

  Hip adduction: *"Push your legs together against my hands."* Position hands on inner thighs.
- **knee flexion:** *"Now bend your right leg up and try to pull your heel towards your bottom as hard as you can against my hand ...... relax; and on left side, try to pull your heel towards your bottom as hard as you can .... and relax."*

  Knee extension: *"and now kick out against my hand and push it away ...... And on the other side."* Make sure that whenever possible, you use the same hand, posture and mechanical advantage to apply the force in order to make valid comparison.
- **Ankle dorsiflexion:** *"Now pull your toes up towards the ceiling and hold them there ...... Don't let me to push them down .... Same on the left side."* with hand on the dorsum of the patient's foot.

  Ankle plantar flexion: *"and don't let me push them towards you (or push my hands down) ...... and same on other side."* with the hand on patient sole.

5. Coordination

- **Heel-shin test:** *"Run your right heel over your left shin from knee down to ankle like this, lift it up and place it back on your knee, now run it down again ...... same on other side."* Abnormal if the heel wavers away from line of shin due to cerebellar ataxia.

6. Sensation

Spinothalamic tract

- **Light touch:** *"I am going to touch you with cotton, this is what it should feel like (touch it to sternum first) ... Please say me yes when you feel it on your legs while look at the ceiling ...... Did it appear same on both the sides?"* Start from thigh and go down in lower limb dermatomes with wisp of cotton wool. Time the stimuli irregularly making it dab rather than stroking or tickling movement. Compare side by side for symmetry.
- **Pin prick:** *"I am now going to touch your legs with small pin, please say me yes when you feel it sharp while look at the ceiling ...... Did it appear same on both the sides?"*
- **Temperature:** *no need to do in the exam*

Dorsal column

- **Vibration:** *"Can you feel this vibrating (over sternum) ...... can you feel it, is it vibrating? (Right big toe tip) ...... Can you feel it, is it vibrating? (Lt big toe tip) .... tell me when it stops vibrating"* if distal sensation is impaired progress proximally until sensation is reported. This could be a more accurate way to test a sensation. Use a 128 HZ tuning fork with flat base. Put a buzzing tuning fork on the bony part of a joint with the patient's eyes closed then ask them to tell you when the buzzing stops (pinch the tuning fork to stop it) to distinguish vibration from pressure sensation.
- **Joint position sense:** *"Could you look at your toe for me? I am now going to move it. This is up and this is down .... Can you look back at the ceiling and tell me which way I am moving your toe?"* Grasp distal phalanx of the great toe at the sides. Stabilize the rest of the toe. Move the joint up and tell patient 'this is up', and down, saying 'this is down'. Flex and extend the joint, stopping at intervals to ask whether the toe is up or down.

"Thank you"

Top tips

- Make sure you test each muscle group individually by stabilising above the joint you are testing.

IV. CASE PRESENTATION

1. UMN Lesions

CASE PRESENTATION:

Well, I have examined this gentleman, in the lower limbs he has

- **Upper Motor Neuron weakness as evidenced by**
  - Hypertonia
  - Hyperreflexia, and
  - Extensor plantars
- **On further examination, he has** (other features may be present depending upon the case)
  - Impaired heel shin test
  - Impaired pin prick sensation with sensory level up to T-10
  - Impaired joint position and vibration sensations
- **He has**
  - Wide based (dorsal column or cerebellum) and high stepping gait (if foot drop)
  - Romberg's test is also positive (dorsal column)

CASE PRESENTATION: Lower Limb Examination in Stroke

Well, I have examined this gentleman, in the right lower limbs he has

- **Upper Motor Neuron type weakness as evidenced by**
  - Hypertonia
  - Hyperreflexia
  - Extensor plantar
- **On further examination, he has**
  - Normal coordination (if applicable) as evidenced by normal heel shin test, and
  - Normal sensations (depending upon level of lesion)
- **He has**
  - Circumduction gait (Hemiplegic)

So, based on this

- My most likely diagnosis is stroke.

Differential Diagnosis

- SOL brain
- Demyelination (MS)
- Todd's Paresis
- Functional

Remember: flexor posturing in upper limb with internal rotation, adduction of the shoulder and flexion at the elbow and wrist.

2. LMN Lesions

CASE PRESENTATION:

Well, I have examined this gentleman, in the lower limbs he has

- **Lower Motor Neuron weakness as evidenced by**
  - Wasting and fasciculations
  - Hypotonia
  - Hyporeflexia and
  - Down going plantars
- **On further examination, he has** (other features may also be present depending upon the cause e.g. if MND then may be following)
  - Normal sensations
  - Dysarthria with nasal quality speech
  - Wasting and fasciculations in the tongue but normal eye movements
  - Palatal paralysis

CASE PRESENTATION: Polio Right Lower Limb

Well, I have examined this gentleman, in the right lower limb he has

- **LMN type weakness as evidenced by**
  - Generalized wasting and fasciculations
  - Hypotonia
  - Hyporeflexia
  - Down going plantars
- **On further examination, he has**
  - Normal sensations, and
  - Ankle deformity
- **He has**
  - High stepping gait on the same side

3. Combined Upper & LMN weakness (MND)

CASE PRESENTATION:

Well, I have examined this gentleman, in the lower limbs he has

- **Both Upper and Lower Motor Neuron features as evidenced by**
  - Wasting and fasciculations (may be the only features of LMN Lesion in the Lower Limbs)
  - Hypertonia
  - Hyperreflexia
  - Positive ankle clonus
  - Upgoing plantars
- **On further examination, he has**
  - Normal sensations

4. Cerebellar Lesion

CASE PRESENTATION:

Well, I have examined this gentleman:

- **In the right upper limb, there is evidence of**
  - Hypotonia
  - Impaired finger nose testing with evidence of dysmetria
  - Intention tremor
  - Dysdiadochokinesia
- **On further examination, there is**
  - Nystagmus in the eyes with fast component towards the right side
  - Slurred and explosive speech
- **In the right lower limb, there is**
  - Impaired heel shin test
- **He is**
  - Ataxic on the right side, with
  - Broad based gait

Differential Diagnosis

- Sensory ataxia
- Vestibular Lesions

5. Polyneuropathy

CASE PRESENTATION 1: Peripheral Sensorimotor polyneuropathy

Well, I have examined this gentleman,

- **he has evidence of**
  - Dry and shiny skin with
  - Loss of hair up to the mid-calves
  - Ulcers and callosities on the sole of the feet
  - Swollen ankle joints with reduced range of movements (Charcot joints)
- **There is also LMN type weakness in this part as evidenced by**
  - Wasting
  - Hypotonia
  - Hyporeflexia
  - Down going plantars
- **On further examination, he has also bilateral symmetrical sensory loss in a stocking distribution as evidenced by**
  - Impaired pin prick sensation
  - Impaired joint position sensation
- **He has**
  - Wide based and high stepping gait with ataxia
  - Positive Romberg test

So, based on this

- My most likely diagnosis is peripheral sensorimotor neuropathy.

CASE PRESENTATION 2: Peripheral Motor neuropathy

Well, I have examined the lower limbs of this gentleman,

- **There is LMN type weakness in the distal parts of lower limbs as evidenced by**
  - Wasting
  - Hypotonia
  - Hyporeflexia, and
  - Down going plantars
- **On further examination,**
  - Sensations are normal.
- **He has**
  - High stepping gate

So, based on this

- My most likely diagnosis is peripheral motor neuropathy.

CASE PRESENTATION 3: Peripheral Sensory Neuropathy

Well, I have examined this gentleman,

- **he has evidence of**
  - Shiny and dry skin with
  - Loss of hair up to the mid-calves
  - Ulcers and callosities on the sole of the feet
  - Swollen ankle joints with reduced range of movements (Charcot joints)
- **There is**
  - No wasting or weakness and reflexes are not depressed
- **On further examination, he has also bilateral symmetrical sensory loss in a stocking distribution as evidenced by**
  - Impaired pin prick sensation

  - Impaired joint position sensation
- **He has**
  - Wide based and high stepping gait with ataxia
  - Positive Romberg test

So, based on this

- My most likely diagnosis is peripheral sensory neuropathy.

6. Charcot-Marie-Tooth Disease

CASE PRESENTATION 1: CMTD (HMSN) in Lower Limbs

Well, I have examined the lower limbs of this gentleman

- **He has evidence of**
  - Bilateral Pes-cavus (high arched feet), hammer toes (scar marks if operated)
  - Distal wasting (giving inverted champagne bottle appearance)
  - Palpable nerves (may be-- particularly at the medial malleolus)
- **There is LMN type weakness in distal parts of lower limbs, as evidenced by**
  - Wasting and fasciculations
  - Hypotonia (may be normal)
  - Depressed ankle reflexes
  - Down going plantars
- **On further examination, he has also bilateral symmetrical sensory loss in a stocking distribution as evidenced by**
  - Impaired pin-prick sensation (may be normal)
  - Impaired joint position sensation and vibration (may be present)
- **He has**
  - Wide based and high steppage gait with ataxia
  - Positive Romberg test

CASE PRESENTATION 2: CMTD (HMSN) in Upper Limbs

Well, I have examined the upper limbs of this gentleman

- **He has evidence of**
  - Pseudo-athetosis (When asked to close the eyes by stretching the arms)
    Pseudo-athetosis is abnormal writhing movements, usually of the fingers, caused by impaired joint position sense (proprioception). Analogous to Romberg's sign.
  - Palpable nerves (especially ulnar nerve at the elbow)
- **And LMN type weakness in the distal parts of upper limbs as evidenced by**
  - Wasting of hands and fasciculations
  - Hypotonia (may be normal)
  - Hyporeflexia
- **On further examination, he has also bilateral symmetrical sensory loss in the glove distribution as evidenced by**
  - Impaired pin-prick sensation (may be normal)
  - Impaired joint position sensation and vibration (may be present)
- **He has**
  - Wide based and high steppage gait with ataxia (bilateral foot drop)
  - Positive Romberg test

Differential Diagnosis

- Peripheral Neuropathy (Polyneuropathy) due to other causes like DM, B12 deficiency etc

7. Myasthenia Gravis

CASE PRESENTATION:

Well, I have examined this Lady

- **She has evidence of**
    - Thymectomy scar (midline sternotomy scar) and
    - Vitiligo
- **There is also evidence of**
    - Variable ptosis which accentuates by sustained upward gaze and improves with brief eye closure
    - Weakness of eye muscles with evidence of diplopia in multiple directions
    - Bilateral facial muscle weakness with lack of facial expression and horizontal smile (Myasthenic snarl)
    - Jaw weakness
    - Weakness of neck muscle
    - Voice has nasal twang with decreased movement of uvula
- **On examination of the upper limbs, there is evidence of**
    - Proximal weakness and fatiguability
    - Deep tendon reflexes and sensations are normal
- **She has**
    - Normal gait (or waddling)

So, based on this

- My most likely diagnosis is Myasthenia Gravis.

Differential Diagnosis

- Lambert Eaton Myasthenic syndrome
- Primary myopathies like inflammatory and mitochondrial myopathies
- Miller-Fisher syndrome
- Snake bite
- Botulism

8. Myotonia Dystrophica

I would like to complete my examination

- By taking detailed history
- Doing the fundoscopy (diabetic retinopathy)
- Heart and chest examination (AF, Pacemaker, CCF etc)
- Urine dipstick for glycosuria
- Examination for testicular atrophy (if male) and
- Thyroid examination (goitre or may be scar)

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
    - Thin, elongated, expressionless face
    - Frontal baldness (if male)
    - Bilateral ptosis but smooth forehead and normal eye movements without evidence of diplopia
    - Wasting and weakness of facial muscles
    - Wasting and weakness of neck muscles
    - There is loss of red reflex (cataracts) and evidence of myotonia in the eyes
- **On examination of the hands, there is evidence of**
    - Fist, handshake, grip and percussion myotonias
    - Wasting and weakness of hand muscles with pin prick marks of the fingers
    - The deep tendon reflexes are depressed
- **He also has**
    - High steppage gait

So, based on this,

- My most likely diagnosis is Myotonia Dystrophica

Differential Diagnosis

DD of myotonia

- Myotonia Congenita
- Mild Tetanus

DD of distal weakness

- Peripheral Neuropathy
- HMSN
- Distal spinal muscular atrophy
- Inclusion body myositis

9. Chorea

CASE PRESENTATION:

Well I have examined this gentleman,

- **He has evidence of involuntary and random movements that are**
    - Brief, irregular and non-repetitive
    - Semi-purposeful (If patient tries to perform voluntary act like itching it could be entrapment)
    - Dancing in quality (may be mild at rest and accentuated by activity like buttoning or un-buttoning)
    - More marked in the face and upper limbs (may be more marked in the lower limbs)
- **There is also evidence of**
    - Abnormal posturing of the hands
    - Motor impersistence and patient cannot maintain a sustained posture, eye-lid closure or tongue protrusion (Jack in the box tongue)
    - Milkmaid grip with alternate squeezing and gripping

So, based on this,

- My most likely diagnosis is Chorea.

10. Idiopathic Parkinson's disease

I would like to complete my examination by taking

- Detailed history including history of medicines
- Complete neurological examination
- MMSE
- Check the postural drop of BP

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
  - Expressionless face
  - Infrequent blinking and
  - Low volume monotonous speech
- **In the right upper limb, he has evidence of** (if right upper limb is involved)
  - Pill rolling resting tremors
  - Bradykinesia
  - Rigidity being cogwheel at the wrist and lead-pipe at the elbow which increases with synkinesis
  - Power, reflexes and coordination in the form of finger nose are normal
  - But has problem with functional capacity and evidence of micrographia
- **He has**
  - Difficulty in starting his walk when asked to walk
  - Walks with narrow based shuffling gait
  - adopts a stooped posture
  - Has reduced arm swinging on the right side
  - Has difficulty in stopping and turning back
- **However, he does not have evidence of**
  - upward gaze palsy or
  - cerebellar involvement

So, based on this and because of asymmetrical signs

- My most likely diagnosis is idiopathic Parkinson's disease.

Differential Diagnosis

- Benign essential tremors
- Huntington Disease: family history and dementia
- Wilson's disease: early onset, chronic hepatitis with abnormal movements etc
- Depression: expressionless face may be associated with disease itself

C. CHEST SHORT CASES

I. CHEST: EXAMINATION

II. CASE PRESENTATION

I. Chest: examination

Introduction & consent

"Hello, my name is Dr ___________. I would like to examine your chest, is that ok? ...... Right."

Position the patient at 45°. Expose to the waist (for female patients, delay this until examining the chest itself).

1. General inspection

- ill/well/ cachexic (assess general state)
- Pale, cyanosed, flushed (colour)
- Oxygen, inhalers (look for clues)
- Short of breath? Accessory muscle use?
- Scars on chest wall?

"Please take a deep breath in." Watch chest movement and symmetry, any coughing?

2. Hands

"Let's start from your hands ...... Please show me your both hands."

- **Inspect:** Tobacco staining, peripheral cyanosis, clubbing, signs of systemic disease (systemic sclerosis, rheumatoid arthritis)
- **Asterixis:** *"Hold your hands out and cock your wrists back."*

3. Arms

"Now I am going to take your pulse, relax the other arm." Time pulse rate & feel for bounding pulse (CO_2 retention)

- Check respiratory rate and pattern with fingers still on the pulse (respiratory rate can increase if the patient is aware you are timing it)
- Check BP (both palpatory and auscultatory method)

4. Neck

- **Trachea:** *"I am going to feel your windpipe, it might be slightly uncomfortable for you."* Feel in sternal notch (deviated?), assess cricosternal distance in finger breadths and feel for tracheal tug.
- **Cervical lymphadenopathy:** *"I am going to feel the glands in your neck."* From behind with patient sat forward palpate lymph nodes of head and neck.
- **JVP:** *"Can you slightly look towards opposite side?"* Raised in cor-pulmonale, fixed and raised in superior vena cava obstruction.

5. Face

- **Inspect:** for signs of Horner's, conjunctival pallor, central cyanosis (stick out tongue), pursed lip breathing.

6. Front of chest

- **Apex beat:** *"I am going to feel for your heart."*
- **Expansion:** *"Breathe all the way out* (Place hands on the lower chest) *...... now a deep breath in."* note distance of thumbs to midline, is expansion equal? Repeat with hands laid on upper chest, equal?
- **Tactile vocal fremitus:** *"Repeat '99' each time you feel my hand on your chest wall."* Palpate with your fingertips. This is rarely used as more information can be gained from vocal resonance.
- **Percussion:** *"I am now going to tap your chest."* Percuss over different respiratory segments, comparing right and left. Remember to percuss dullness of upper border of liver in 5th ICS in midclavicular line, 7th ICS in midaxillary line and 9th ICS in midscapular line of right side.
- **Auscultation:** *"Take steady breaths in and out through your mouth."* Listen with diaphragm from apices to bases, comparing right and left.
- **Vocal resonance:** *"I am going to listen to your chest again, can you repeat '99' each time you feel the stethoscope."* Repeat auscultation. If marked vocal resonance heard, repeat with asking patient to whisper '99'; if clearly heard this is termed whispering pectoriloquy' and is a sensitive sign for consolidation. Outside of exams, the choice of vocal resonance, vocal or tactile buzz is a personal preference. Many clinicians prefer vocal resonance as it is an easier skill to master and provides other more information than tactile buzz.

7. Back of chest

- Expansion
- Tactile vocal fremitus
- Percussion
- Auscultation
- Vocal resonance

8. To complete the examination

- Palpate for sacral and ankle oedema
- Check peripheral pulses, observation chart for temperature and O_2 saturation
- Examine the sputum pot and check PEFR

Top tips

- Whispering pectoriloquy is a classic sign of consolidation and is specific, so worth picking up.
- If you don't adequately expose the chest you may miss small scars e.g. from video thoracoscopy.
- If you see Horner's syndrome, check for wasting of the small muscles of the hand.

II. CASE PRESENTATION

1. COPD

I would like to complete my examination by ………

I have examined this gentleman,

- **he is**
  - Cachectic, has cushingoid appearance and breathless at rest
- **In hands there is evidence of**
  - Nicotine staining
  - Tremors
  - Asterixis
  - Pulse is regular and JVP is not raised
  - He also has evidence of cyanosis
- **Chest** is hyper-inflated, and trachea is central in position

In whole of the chest on both sides

  - Chest expansion is reduced
  - Percussion note is hyper-resonant
  - Breath sounds are reduced and there is evidence of vesicular breathing with prolonged expiration and expiratory wheezing
  - Vocal resonance is also reduced

Differential Diagnosis

- Asthma
- Bronchiolitis obliterans (No history of smoking)

2. Pleural effusion (right sided)

CASE PRESENTATION:

Well, I have examined this gentleman,

- **he is**
  - Cachectic
  - In the hands he has
    - Nicotine Staining
    - Clubbing and
    - Wasting of small muscles of right hand (may be not)
  - Pulse is regular and JVP is not raised.
  - Left cervical lymph nodes are palpable.
  - Pallor, with evidence of Horner syndrome.
  - There is no edema.
- **Trachea** is central in position (deviated towards other side only if massive effusion or same side if there is collapse on the same side as well)
- **Right lower part of the chest is bulging and in the right lower part of the chest,**
  - Chest expansion is reduced
  - Percussion note is stony dull
  - Breath sound are reduced
  - Vocal resonance is also reduced

Differential diagnosis

- Collapse

3. ILD

CASE PRESENTATION: ILD & STEROID THERAPY

Well, I have examined this lady;

- **She has**
    - **Cushingoid appearance** with multiple striae and is breathless at rest **(with oxygen therapy)**
    - **In the hands** there is evidence of
        - Clubbing, and
        - Peripheral cyanosis
    - **Pulse** is regular and **JVP** is not raised.
- Chest **is of normal shape and trachea is central in position.**
- **In the lower part of chest on both sides**
    - Chest expansion is reduced
    - Percussion note is normal (impaired)
    - There are end inspiratory crackles that do not change on coughing
    - Vocal resonance is normal (reduced)

CASE PRESENTATION: ILD + Scleroderma + Pulmonary HTN + Steroid Therapy

Well, I have examined this lady, she has

- **Cushingoid appearance** and **breathless** at rest (and on oxygen therapy)
- **In the hands** there is evidence of
    - Clubbing and peripheral cyanosis
    - Ulcers, pitting, scars, infarcts of fingertips
    - Sclerodactyly
    - Smooth and shiny skin at the back of hands
- **In the arms** there is evidence of
    - Purpura and striae
- **JVP** is raised (not raised)
- **In the face** there is evidence of
    - Thinning of nose
    - Puckering of skin around the mouth
    - Reduced opening of mouth

- **Chest is of normal shape and Trachea is central in position**
- **In the lower part of the chest, on the both sides**
    - Chest expansion is reduced
    - Percussion note is normal (impaired)
    - Breath sounds are reduced and there are inspiratory crackles that don't change on coughing
    - Vocal resonance is normal (Reduced)
- There is also evidence of left Parasternal heave.
  The pulmonary component of the 2nd heart sound is also loud and Peripheral edema is also present.

Differential diagnosis

- Bronchiectasis
- Pulmonary edema
- Non-cardiogenic pulmonary edema

4. Bronchiectasis

CASE PRESENTATION:

Well, I have examined this gentleman, he is

- **Cachectic**
- **In the hands** he has
  - clubbing
- There is no peripheral edema.

- **Chest is of normal shape and trachea is central in position.**
- **In the right lower part of the chest**
  - Chest expansion is reduced
  - Percussion note is resonant (dull)
  - There are inspiratory crackles that change on coughing
  - Vocal resonance is reduced (normal)

Causes of clubbing with crackles in the chest

- Bronchiectasis
- ILD
- Lung cancer
- Lung abscess

5. Right lower lobectomy

CASE PRESENTATION:

Well, I have examined this gentleman;

- **He has evidence of**
    - **Cachexia**
    - **In the hands** he has
        - Nicotine staining
        - Clubbing
    - Left cervical lymph nodes are palpable.
    - Pallor
- There is evidence of **Thoracotomy scar** on the right side. Trachea is central in position.
- **In the Right lower part of the chest**
    - Chest expansion is reduced
    - Percussion note is dull
    - Breath sounds are absent (reduced)
      Vocal resonance is also reduced

D. ABDOMEN SHORT CASES

I. ABDOMEN: EXAMINATION

II. CASE PRESENTATION

I. Abdomen: Examination

Introduction & consent

"Hello, my name is Dr __________. I would like to examine your tummy, is that ok? .... Right."
Lie the patient down as flat as possible, ideally exposing from 'nipples to knees' although in practice keep the groin covered and examine separately for hernias, etc.

1. General inspection

- ill/well/cachexic (**assess general state**)
- Pale, jaundiced, uremic (**colour**)
- Vomit bowl, stoma bags (**look for clues**)
- Body mass index?
- Scars on the abdomen? Stomas?

"Can you lift your head off the bed?" Look for bulges, distension or pain.

2. Hands

"Let's start from your hands ...... Please show me your both hands."

- **Inspect:** clubbing, koilonychia, leukonychia, Muehrcke's lines, palmar erythema, Dupuytren's contracture, pigmentation of the palmer creases.
- **Asterixis:** *"Hold your hands out and cock your wrists back."*

3. Arms

"Now I am going to take your pulse, relax the other arm."

- Check pulse and BP
- Look in the distribution of the SVC (arms, upper chest, upper back) for spider naevi
- Check for track marks, bruising, pigmentation, scratch marks, arteriovenous fistulae

4. Neck

- **Cervical lymphadenopathy:** *"I am going to feel the glands in your neck."* From behind with patient sat forward palpate lymph nodes of head and neck for cervical and supraclavicular lymph nodes (Supraclavicular, Posterior triangle, Jugular chain, Preauricular, Postauricular, Submandibular, Submental, Occipital)
- **JVP:** *"Can you slightly look towards opposite side?"* JVP is raised in fluid overload (renal dysfunction, liver dysfunction), tricuspid regurgitation (may cause pulsatile hepatomegaly).
- **Scars:** From tunnelled haemodialysis lines or other central venous access

5. Face

- **Skin and eyes:** jaundice, conjunctival pallor, Kayser-Fleischer rings, xanthelasma, sunken eyes (dehydration)
- **Mouth:** angular stomatitis, pigmentation, telangiectasia, ulcers, glossitis

6. Abdomen

Inspection

- **Scars:** previous surgery, transplant, stoma
- Visible masses, hernias or pulsation of AAA
- Visible veins suggesting portal hypertension
- Gynaecomastia, hair loss, acanthosis nigricans

Palpation

"Do you have any pain in your tummy? ... Ok ... now I am going to examine it and will take care of it." Squat by the bed so that the patient's abdomen is at your eye level. Ask if there is any pain and examine this part last. Watch the patient's face for signs of discomfort. Palpate the entire abdomen:

- **Light palpation:** If this elicits pain, check for rebound tenderness. Any involuntary tension in muscles (guarding)?
- **Deep palpation:** To detect masses.
- **Liver:** *"Can you please take gentle deep breath?"* Using the radial border of the index finger aligned with the costal margin start palpation from the RIF. Press down and ask patient to take a deep breath. Continue upwards towards the costal margin until you feel the liver edge.

- **Spleen:** *"Can you please take gentle deep breath again?"* Start palpation from the RIF and work towards the left costal margin asking the patient to take a deep breath in and feeling for the edge of the spleen-much like palpating the liver.
- **Kidneys:** *"Now I am going to feel your kidneys."* For each kidney, place one hand behind patient at the loin, press down on the abdomen with your other hand and flick the kidney up with your lower hand against your upper hand.
- **Aorta:** Palpate midline above umbilicus, is it expansile?

Percussion

"I am going to tap your tummy now; it would not hurt you." Percuss each just after palpation of each organ and don't leave at the end for collective palpation.

- **Liver:** Percuss to map upper & lower border of liver.
- **Spleen:** Percuss from border of spleen as palpated, around to mid-axillary line.
  - **Traube's (semilunar) space:** anatomic space with left sixth rib superiorly, left mid axillary line laterally, and left costal margin inferiorly. Percuss for splenomegaly in this space.
  - **Castell's method:** Percuss for splenomegaly the lowest intercostal space in the left anterior axillary line in supine position in full inspiration and then full expiration. If the note changes from resonant on full expiration to dull on full inspiration, the sign is regarded as positive.
- **Bladder:** If enlarged, suprapubic region will be dull.
- **Ascites:** Shifting dullness: Percuss centrally to laterally until dull, keep your finger at the dull spot and ask patient to lean onto opposite side. *"Can you please lean onto the opposite side."* If the dullness was fluid, this will now have moved by gravity and the previously dull area will be resonant.

Auscultation

"Now I will listen to your tummy."

- **Bowel sounds:** Listen just below the umbilicus.
- **Bruits:** Listen over aorta and renal arteries (either side of midline above umbilicus)

7. To complete the examination

- *"Now I am going to feel the glands in your groin. Can you please look to the opposite side? ... cough now."* Examine the hernial orifices, external genitalia and perform a rectal examination.
- *"Can you please roll up your trouser and show me your shins? .... I am going to press it for any swelling."* Palpate for ankle oedema.
- Check the observation chart for temperature and urine dipstick.

Top tips

- If you think there is a spleen tip, roll the patient onto their right side and feel again. This tips the spleen forward and allows you to percuss around to the back (try to do this at the same time as shifting dullness to look super slick)
- Don't forget to check the back for spider naevi, even if the chest appears clear, you can miss a valuable sign (look for nephrectomy scars as you do this)
- Light palpation really should be light, a quick check for tenderness and very large masses, watching the patient's face throughout.

II. CASE PRESENTATION

1. CLD

CASE PRESENTATION: CLD with splenomegaly OR hepatosplenomegaly OR hepatomegaly with OR without Ascites

I have examined this gentleman,

- **he is**
  - **Cachectic**
  - **In the hands** there is evidence of
    - Clubbing
    - Leukonychia
    - Palmar erythema
    - Dupuytren's contractures
    - Flapping Tremors (If encephalopathy)
- **In the arms, there is evidence of**
  - Scratch marks and bruising
- **On further examination, there is evidence of**
  - Pallor
  - Jaundice
  - Multiple spider nevi in the chest
  - Bilateral gynaecomastia
  - Decreased body hair
- **On examination of the abdomen**
  - It is distended with evidence of prominent veins, white striae and umbilical hernia
  - But soft and non-tender
  - There is evidence of splenomegaly (hepatosplenomegaly/hepatomegaly) with splenic edge being palpable 3 fingers breadth below the left costal margin which is firm, smooth and non-tender and moves with respiration
  - There is clinically detectable ascites as evidenced by shifting dullness
  - Bowel sounds are audible
- **However, there is no evidence of**
  - Lymphadenopathy and
  - Peripheral edema is not present

So, based on this my most likely diagnosis is Cirrhosis with Portal Hypertension

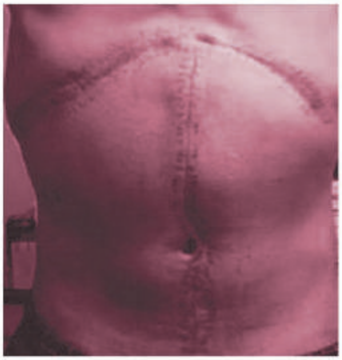
2. Liver transplant

CASE PRESENTATION:

Well, I have examined this gentleman, he has evidence of

- **Cushingoid appearance with**
  - Thinning of skin,
  - Bruising
  - Excessive hair and acne
  - Striae on arms and abdomen (if Cushing syndrome due to recurrent graft rejection and chronic steroids use)
- **He has also evidence of**
  (Cyclosporin side effects and immunosuppression)
  - Gum hypertrophy
  - Excessive hair growth
  - Tremors in the hands
  - Pin prick marks in the fingers
  - Papillomas and skin warts

  - Palmar erythema (may be present due to CLD previously)
  - Spider nevi on chest (may be present due to previous CLD)
- **On examination of the abdomen,** there is evidence of
  - Mercedes Benz (Roof top scar) which is non-tender
  - Abdomen is also soft and non-tender
  - There is no clinically detectable visceromegaly or ascites
    (May be residual splenomegaly due to portal HTN previously and there may be palpable liver edge which will be non-tender if no graft rejection after transplantation)



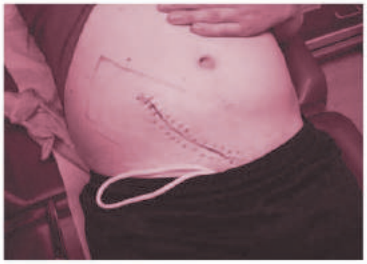
- **However, he does not have evidence of**
  - Flapping tremors
  - Jaundice
  - Pallor

So, based on this

- My most likely diagnosis is liver transplantation which is functioning well.
- The underlying cause seems to be cirrhosis due to alcohol.
- He has stigmata of steroids and immunosuppression.

3. Renal transplant

CASE PRESENTATION:

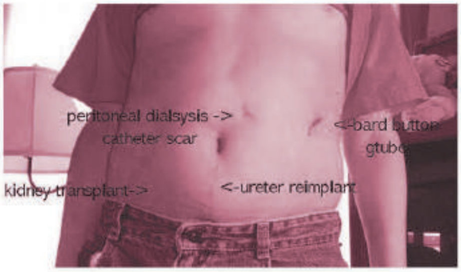


I have examined this gentleman,

- **he has**
    - Cushingoid appearance
- **There is evidence of**
    - Pin-prick marks
    - Tremors, and
    - Gum hypertrophy
- **He has also**
    - Scar in the left lower arm with AV fistula, which is non-functional at the moment, and
    - Multiple scars in the right upper chest
- **On examination of the abdomen**
    - There is a scar in the right iliac fossa which overlies a firm, smooth and non-tender mass which is dull to percussion and there is no bruit over it.
- **However, he does not have evidence of**
    - Uraemia
    - Pallor and
    - Fluid overload

So, based on this

- My most likely **diagnosis** is End stage Renal disease and the underlying cause seems to be DM.
- The current mode of Renal replacement therapy is **Renal Transplant** which is functioning very well.
- Previous modes include AV fistula and tunnel catheter.
- He also has **side effects** related to steroids use and Immunosuppressive therapy.



4. APKD

CASE PRESENTATION:

I have examined this gentleman,

- **he has**
  - Distended abdomen with fullness in the flanks
  - It is soft and non-tender
  - There are bilateral flank masses with irregular surface, ballotable and I can get above it
  - They are resonant to percussion (Dull when massively enlarged)
  - There is no bruit or rub over it
- **However, he does not have evidence of**
  - Uraemia
  - Pallor and
  - Fluid overload

So, based on this my diagnosis is Bilateral Polycystic Kidneys

Differential Diagnosis (especially if unilateral mass)

- Hydro-nephrosis
- Renal cell carcinoma
- Adrenal mass

5. Mass originating from stomach or Pancreas

CASE PRESENTATION:

I have examined this gentleman,

- **he is**
  - Cachectic
- **There is evidence of**
  - Clubbing
  - Pallor (Jaundice)
  - Lymphadenopathy (Site, Size, Shape, Number, tender (Non-tender), discrete (matted)
- **On examination of the abdomen**
  - It is asymmetrical
  - There is a mass in the left hypochondrium which is hard with ill-defined borders and tender
    - Not fixed to the abdominal wall
    - Not ballotable
    - Non-pulsatile
    - Does not move with respiration
    - I could get above it
    - Dull to percussion
    - There is no bruit or bowel sounds audible over it

So, based on this my most likely diagnosis is mass originating form Pancreas or Stomach

E. ENDOCRINOLOGY SHORT CASES

I. THYROID: EXAMINATION

II. DM: EXAMINATION

III. CUSHING'S/ACROMEGALY: EXAMINATION

IV. CASE PRESENTATION

I. Thyroid: Examination

Introduction & consent

"Hello, my name is Dr _____________. I would like to examine your thyroid, is that ok? ...... Right."

1. Inspection

Position patient sitting on a chair with space behind, adequately expose neck and inspect from front and sides for

- Goitre or swelling
- Thyroidectomy collar scar
- Signs of hypothyroidism (hypothyroid facies, obesity, wearing warm clothes in warm room) or hyperthyroidism (thyrotoxic facies, tremulous /agitated, wearing not many clothes in a cold room)
- Any abnormal pulsation in neck; distended veins from SVC obstruction; and tracheal deviation.

2. Swallow test

"Sip water ... hold in your mouth ...... and swallow." While standing in front of the patient see if any midline swelling moves up on swallowing.

3. Tongue protrusion test

"Can you stick out your tongue" Thyroglossal cyst will move upward but this should have no effect on a thyroid swelling. If evidence favours lump not arising from thyroid, examine lump like any other.

4. Palpation

"Now I am going to stand behind you to examine your neck."

- *"Can you tilt your head back slightly."* Whilst standing behind the patient look for proptosis. **(Proptosis)**
- *"Do you have any pain in your neck? ...... Ok now I am going to feel your thyroid gland."* Place middle 3 fingers of either hand along midline below chin; and walk down to thyroid. Assess any enlargement/ nodules (diffuse or nodular enlargement, lobe or isthmus, tender or non-tender) **(Thyroid)**
- *"Now I will ask you to sip water ... hold in your mouth until I tell you to swallow ... and now swallow."* Hand your patient a glass of water while standing behind him while palpating the thyroid; attempt to 'get under the lump during swallowing for any retrosternal extension of goitre. **(Swallow test)**
- *"I am now going to examine the other glands in your neck."* **(Lymph nodes of head and neck)**
- *"I am going to feel your windpipe."* Palpate for tracheal deviation from the midline.

5. Percussion

"Now I am going to tap your chest." Percuss the sternum for dullness of retrosternal extension of a goitre while standing in front of the patient.

6. Auscultation

"Now I am going to listen to your thyroid gland." Listen over the goitre for a bruit.

7. Hands

"Can you hold out your hands in front?"

- Place sheet of paper over out-stretched hands to look for fine tremors.
- Inspect for thyroid acropachy (triad of clubbing, soft tissue swelling of the hands, feet and periosteal new bone formation), palmar erythema and onycholysis (separation of a fingernail or toenail from its pink nail bed)
- Temperature
- Pulse: rate and rhythm (atrial fibrillation, tachycardia or bradycardia)

8. Eyes

- *"Can you please look straight?"* Inspect from side when patient is starring forward for exophthalmos (white of the eye below the cornea) and lid retraction (white of the eye above the cornea).

- *"Now look at my finger here and follow it all the way up and all the way down."* Lid lag: the upper eye lid lag behind on downward gaze as finger move from a point above the eye to below.

- *"Can you please follow my finger, keeping your head still ...... Any double vision?"* Eye movements: move finger to make an 'H' shape to look for external ophthalmoplegia.

9. Completion

- *"Can you please stand up for me? …… ok sit down again for me."* To assess for proximal myopathy.
- *"Can you roll up your trousers above your knees?"* Look for pretibial myxoedema.
- *"Can you face away from me with your knees resting on chair?"* Test ankle reflexes for delayed relaxation of tendon jerks in hypothyroidism and hyperreflexia in thyrotoxicosis.

"Ok thank you very much …. It has been marvellous to examine you." and wash hands.

Notes:

- **Hypothyroid face signs**
  - Peaches & cream complexion (pale complexion with rosy cheeks)
  - Loss of hair on outer third of eyebrows
  - Baggy eye lids
- **Don't forget Pyramidal lobe of thyroid**

II. DM: Examination

Introduction & consent

"Hello, my name is Dr ____________. I would like to examine you, is that ok? ...... Right."

Examine in lying position preferably starting from legs.

1. General inspection

- Weight: obesity, hydration
- Endocrine facies
- Pigmentation: haemochromatosis etc.

2. LEGS

Inspection

- **Skin:** necrobiosis lipoidica, diabetic dermopathy, hair loss, infection, pigmented scars, atrophy, ulceration, injection sites.
- **Muscle wasting**
- **Joint destruction:** Charcot's joints

Palpate

- **Temperature of feet:** (cold, blue owing to small or large vessel disease)
- **Peripheral pulses:**
  - Femoral (auscultate)
  - Popliteal
  - Posterior tibial
  - Dorsalis pedis
- **Oedema:** *"I am going to press your shins for any swelling."*
- **Neurological assessment**
  - ***Femoral nerve mononeuritis:***
    - *"Can you please lift your leg straight up against my hand?"*
  - ***Peripheral neuropathy:***
    - *"Please look at the ceiling ... I am going to touch your legs with cotton ... Please say me yes when you feel it .... Did it appear the same on both side?"* ***(Light touch)***
    - *"I am now going to touch your legs with small pin ...... Do you feel it here a sharp? ... and this is dull .... Please say yes when you feel it sharp."* ***(Pin prick)***
    - *"Can you feel this vibrating? (over sternum) ...... can you feel it, is it vibrating? (Right big toe tip) ...... Can you feel it, is it vibrating? (Lt big toe tip) .... Tell me when it stops vibrating" if distal sensation is impaired progress proximally until sensation is reported. Use a 128 HZ tuning fork with flat base.*
    - *"I am now going to move your toe ... Could you look at your toe for me? ...... This is up and this is down ...... Can you look back at the ceiling? ... Tell me which way I am moving your toe?"* ***(Joint position sense)***

3. ARMS

Inspect

- Injection sites
- Skin lesions

Pulse & BP

4. EYES

- **Fundoscopy:** rubeosis, retinal disease
- **Cataracts**
- **3rd nerve palsy**

5. MOUTH AND EARS

- **Infection**

6. NECK

- **Carotid arteries:** palpate, auscultate

7. CHEST

- Signs of infection

8. ABDOMEN

- Liver - fat infiltration; rarely haemochromatosis
- Fat hypertrophy - insulin injection sites

9. OTHER

- Urine analysis - glycosuria, ketones, proteinuria
- Blood pressure and pulse - lying and standing

III. Cushing's/Acromegaly: Examination

Introduction & consent

"Hello, my name is Dr ____________. I would like to examine you, is that ok? ...... Right."

1. General inspection

- Diagnostic facies (acromegaly, Cushing's, thyroid — old photos)

2. Hands/arms (hands in the lap then outstretched for tremors)

- **Hands:**
    - Shape of hands, sweating
    - Phalen's/Tinel's test (carpal tunnel)
- **Arms:**
    - Ulnar nerve thickening (in acromegaly)
    - BP
    - Proximal myopathy/ upper limb reflexes
- **Axilla:**
    - Acanthosis nigricans, skin tags, greasy skin.

3. Face

- **Face:**
    - Frontal bossing, prognathism, macroglossia, hoarseness, hirsutism
- **Eyes:**
    - Visual fields;
    - III, IV, VI, V cranial nerves
    - Fundoscopy

4. Neck

- **Thyroid gland** (diffuse or nodular goitre)

5. Heart

- Cardiac failure

6. Abdomen

- Organomegaly

7. Lower limbs

- Hips & knees: osteoarthritis, pseudo-gout
- Heel pad thickening
- Proximal myopathy / distal weakness (entrapment neuropathy)
- Ankle jerks
- Peripheral neuropathy

8. Other

- Urine analysis (glycosuria)
- Rectal examination - colonic polyps (correlate with skin tags)
-

IV. CASE PRESENTATION

1. MNG

I have examined this gentleman,

- **He has**
  - Bilateral, multinodular enlargement of the thyroid gland, and with no single dominant nodule.
  - Enlarged thyroid moves on swallowing but does not move on tongue protrusion.
  - It is not tender.
  - There is no retrosternal extension, or bruit.
  - There is no lymphadenopathy.
- **He does not have features of**
  - Hyper or hypothyroidism, and
  - Graves' disease.

So, based on this

- My diagnosis is multinodular goitre.
- The patient is clinically euthyroid.

CASE PRESENTATION 1

Well, I have examined this gentleman,

- **he is**
  - Thin
  - Appears fidgety
  - Hands are sweaty with palmar erythema and a fine tremor of the outstretched hands.
  - The pulse is ____ beats per minute (tachycardic) and irregular (suggestive of AF).
  - There is lid lag and lid retraction.
  - There is evidence of a proximal myopathy.
  - There is no palpable goitre and there is no evidence of previous thyroidectomy. There are no features of Graves' disease.

So, based on this

- This patient has hyperthyroidism.
- I would like to ask for a history of weight loss, diarrhoea, palpitations, and heat intolerance.

CASE PRESENTATION 2

Well, I have examined this gentleman,

- **he has**
  - Obesity
  - Generalized slowness of movement and speech.
  - Dry hair and dry skin with cool peripheries.
  - Pulse is ____ beats per minute (bradycardic).
  - There is no evidence of lid lag or lid retraction.
  - There is periorbital swelling and generalized, non-pitting oedema.
  - There is evidence of a proximal myopathy.
  - There is no palpable goitre and there is no evidence of previous thyroidectomy.
  - There are no features of Graves' disease.

So, based on this

- This patient has hypothyroidism.
- I would like to enquire about a history of weight gain, constipation, tiredness, and cold intolerance.
- I would like to examine for slow-relaxing deep tendon reflexes and for associated autoimmune disease.

2. Graves' disease

CASE PRESENTATION:

Well, I have examined this gentleman

- **He has evidence of**
  - Bilateral exophthalmos with ophthalmoplegia (and resultant diplopia)
    But no evidence of chemosis, exposure keratitis, or corneal ulceration.
  - Visual acuity is normal, and
    There is no evidence of RAPD.
  - Digital clubbing consistent with thyroid acropachy
  - Pretibial myxoedema
- **There is a thyroidectomy scar and no palpable goitre.**
- **The patient is clinically euthyroid.**

So, based on this

- My diagnosis is Graves' disease.
- This patient previously had a thyroidectomy and has a euthyroid status (on thyroxine replacement therapy).
- I would also like to look for evidence of autoimmune disease.

3. Hypothyroidism

CASE PRESENTATION 1:

I have examined this gentleman,

- **he has**
    - obesity
    - slow movement, and slow speech.
    - There is dry hair and dry skin, with cool peripheries.
    - There is periorbital swelling and generalized, non-pitting oedema.
    - The pulse rate is slow (mention heart rate).
    - There is no evidence of Graves' disease.

So, based on this

- My diagnosis is hypothyroidism.
- I would like to examine for slow-relaxing deep tendon reflexes, and for associated autoimmune disease.

CASE PRESENTATION 2:

I have examined this gentleman,

- **he has**
    - Exophthalmos and ophthalmoplegia.
    - There is a thyroidectomy scar.
    - The patient is hypothyroid, as evidenced by the bradycardia, elevated body mass index, slow movement and slow speech.

So, based on this

- My diagnosis is treated Graves' disease, and resultant hypothyroidism.

4. Acromegaly

CASE PRESENTATION:

I have examined this gentleman,

- **he has**
  - Large hands with thick skin;
  - Broad sweaty palms with dough feeling; and
  - Spade like fingers.
- **The face has**
  - Prominent supraorbital ridges, enlarged nose and lips
  - Prognathism
  - Macroglosia (enlarged tongue)
  - Splaying of teeth (interdental separation)
  - Bitemporal hemianopia
- **In the neck and axilla, there is evidence of**
  - Acanthosis nigricans
  - Molluscum fibrosum
- **There is evidence of**
  - Hypertrichosis
  - Gynaecomastia.

So, based on this

- My diagnosis is acromegaly.

5. Cushing's syndrome

CASE PRESENTATION:

Well, I have examined this gentleman,

- **he has**
    - Cushingoid facies with moon like puffy, plethoric face + acne + hirsutism / virilism
    - Interscapular (buffalo hump) and supraclavicular fat pad
    - Centripetal obesity with lemon on a matchstick appearance of abdomen
    - Acne vulgaris on the face and trunk
    - Purpuric and petechial rashes consistent with bruising and thin skin
    - Violaceous striae on the abdomen (pink / purple striae)
- **There is evidence of**
    - Proximal myopathy
    - Spine tenderness
- **There are no adrenalectomy scars.**

So, based on this

- My diagnosis is Cushing's syndrome.
- I would like to check his urine dipstick for glycosuria and BP

6. Addison's disease

CASE PRESENTATION:

Well, I have examined this gentleman,

- **he has evidence of**
  - Widespread pigmentation, most marked in the buccal mucosa, skin creases, and pressure areas.
  - There is also calcification of the auricular cartilage.

So, based on this

- My diagnosis is Addison's disease.
- There are no adrenalectomy scars to suggest Nelson's syndrome.
- I would like to examine for postural hypotension and look for evidence of other autoimmune disease and previous tuberculosis infection.

F. RHEUMATOLOGY SHORT CASES

I. LOCOMOTOR SYSTEM: EXAMINATION
II. HANDS: EXAMINATION
III. CASE PRESENTATION

I. Locomotor system: examination

(GALS — Gait, Arms, Legs, Spine)

Introduction & consent

"Hello, my name is Dr __________. I would like to examine your back, arm and legs, is that ok? ...... Right."

- *"Do you have pain or stiffness in muscles, joints, or back?"*
- *"Can you dress yourself without difficulty?"*
- *"Can you walk up and downstairs without difficulty?"*

"Can you please undress to the underpants and stand in front of me?"
"Let me give you a hand up."

1. Gait

"Can you please walk towards me? ... Turn around and walk back .... Could you do that again for me please?"

2. Spine

- *"Could you stand here for me please ... with your legs slightly apart .... I am now going to examine your back."* *Standing behind the patient.*
  - Assess the straightness of spine (thoracic kyphosis and loss of lumbar / cervical lordosis).
  - Look at the symmetry and muscle bulk in the neck, trunk, upper limbs and lower limbs.
  - Look for asymmetry at the level of iliac crest which may be due to leg shortening.
  - Look for swelling or other abnormality of gluteal, hamstring and calf muscles.
  - Look at Achilles' tendon and hind foot for any swelling or deformity (squeeze heels for enthesitis & Achilles tendinitis).
- *"I am going to palpate here .... Is that sore?"* (Palpate for hyperalgesia in the belly of supraspinatus muscle on right side) *"How about that?"* (on left side)
- *"Could you try to touch your toes."* Stand beside the patient while he bends down as well as spinal flexion. Look for exacerbation of scoliosis or limitation of hip flexion. Inability to touch the toes suggest early lumbar disease. **(Finger floor distance)**

  Schober's test —Identify posterior superior iliac spine (approximately at L5). Place a mark 5 cm below and 10 cm above this point. Patient is asked to touch his toes. (>5 cm increase in distance).
  Modified Schober's test only uses the mark above the posterior superior iliac spine as the lower one doesn't change with bending forward.
- *"I going to hold your pelvis ... could you turn from side to side."* Stand behind the patient and hold the pelvis to stop it moving. This test rotational movements happening mostly in the thoracic spine.
- *"Could you slide down your right hand outside of your right thigh towards your knee as far as possible ... and same on your left side."* Test lateral flexion which mostly occurs in the lumbar spine movements. Measure the distance from the tip of long finger to floor while standing straight and bending to the side, calculate the difference (>10cm difference normally).
- Chest expansion for thoracic spine (costovertebral joints) if time permits
- *"Could you turn towards me? ... Can you try to put your right ear to your right shoulder? ... and same on your left ... look up at the ceiling (cervical extension) .... and down to your chest (cervical flexion)."*
- *"Please look straight ahead ... Can you open your mouth? ... and move your jaw side to side."* Testing function in the temporo-mandibular joint.
- *"Can you stand with your back and heels touching to the wall?"* Also look for occiput to wall distance (without raising chin above the carrying level & lateral rotation.

3. Arms

Ask to move:

*"Please copy the **movements** which I make with my arms."*

- *"Try putting your hands behind your head and elbows going back."* Test abduction and external rotation at glenohumeral joints.
- *"Please put your elbows aside your body at 90 degrees & demonstrate full range of pronation and supination."*
- *"Bring the hands up to touch the shoulders."* Elbow flexion

- *"Please oppose the fingers and palms."* Prayer sign
  "Put the backs of hands together in the similar fashion." Reverse prayer sign
- *"Hold your arms straight out in front of your body."* Elbow extension
- *"Make a fist and open the hand flat."*
  "Please relax your arms"

Power (Small muscles of hands):

- *"Please squeeze my index and middle fingers"* Power grip
- *"Please make a pincer grip and don't let me break it."* Pincer grip
- *"Please touch each finger with your thumb."*
- Abduction / adduction fingers if time permits
- *"I am going to gently squeeze your hand ... let me know if it is soar."* Gently squeeze across the metacarpal heads to test for sponginess or tenderness.

Function:

- *"I would like you to pretend to write a sentence with your right hand .... And now same with your left hand."*
- *"Can you undo a button?"*
- *"Can you pick up a coin?"*

4. Legs

"Can you please lie on the couch supine"

- *"I am going to bend your knees."* While putting one hand underneath the patient's lumbar spine and the other arm underneath the knees of the patient to bend them.
- *"Could you straighten your left leg for me?"* Thomas' test: look for fixed flexion deformity of hip.
- *"Could you bend your knee for me? .... Could you bend this knee as well for me?"* Examine the range of flexion in the hip and knee with the hand on patient's knee to feel for crepitus in the patello-femoral joint. Normal limit of flexion is 120° at hip and 140° at knee.
- *"Could you bend this knee for me? ... Could you bend your left knee?"* Flex the patient's hip at knee at 90° and passively rotate each hip internally and externally. Normal range is 45° in each direction.
- Palpate each knee for warmth and swelling (features of inflammation).
- Check for patellar tap caused by knee joint effusion. With the left hand, milk the content of supra-patellar fat pad into the joint.
- Look at the feet for any abnormality (hallux valgus, clawing and crowding of toes (in RA). Examine the soles, looking for calluses or ulcers indicating abnormal weight bearing. Remember to look at the back of heels which could be a site of pressure sores in bed bound patients. Look at the alignment of the toes.
- *"I am going to gently squeeze your feet across .... Let me know if this is soar"* Gently squeeze the metatarsal heads together to see if there is any tenderness from inflammatory arthritis.

"Thank you"

Note:

- **EYES** (uveitis), **HEART** (AR, MVP, conduction defects), **CHEST** (apical fibrosis), **NAILS, DACTYLITIS**
- Ask to lie on stomach
  - Spring test — press sacrum to illicit tenderness in SI joint
  - Femoral stretch test (L4 & above)

II. Hands: Examination

Introduction & consent

"Hello, my name is Dr ___________. I would like to examine your hands, is that ok? ..... Right."

- *"Do you have pain in your hands or arms? ... alright."*

Position the patient appropriately. Expose the arms, then ask the patient to rest their hands on a pillow. Always ask about pain or tender areas. With the hands, particularly in acute arthritis, the standard joint examination routine of "look, feel, move" is better amended to "look, ask the patient to move, then feel" to avoid causing pain.

1. Look for

Palmar aspect:

- **Skin**
    - Colour — pigmentation of palmar creases, palmar erythema
    - Consistency — tight (sclerodactyly), thick (DM, acromegaly)
    - Characteristic lesions — pulp infarcts, rashes, purpura, spider naevi, telangiectasia, tophi, scars (CTS)
- **Muscles**
    - Look for muscles' wasting and fasciculations
        - **Thenar wasting** -- median nerve lesion
        - **Generalized wasting**-- hypothenar, dorsal interossei, but sparing of the thenar eminence = ulnar nerve lesion
    - Dupuytren's contracture and perform Tinel's test (percuss over the distal skin crease of the wrist-tingling suggests carpal tunnel syndrome.
- **Joints**
    - Acute inflammation (swollen, red joints)
    - Deformities of chronic arthritis:
        - Ulnar deviation at the wrist
        - Z deformity of the thumb

Dorsum:

- **Skin**
    - Look for the same skin changes as the palm, plus
        - Tendon xanthomata
        - Psoriatic plaques
        - Joint replacement scars
- **Nails**
    - Pitting and onycholysis
    - Clubbing
    - Nail fold infarcts and splinter haemorrhages
    - Beau's lines, koilonychia, leukonychia
- **Muscles**
    - Muscle wasting, particularly of dorsal interossei.
- **Joints**
    - Swan-neck (flexed DIP, hyperextended PIP
    - Boutonnières (hyperextended DIP, flexed PIP)
    - Bouchard's nodes (PIP joints)
    - Heberden's nodes (DIP joints)
    - Subluxation and deviation of wrist and MCP joints
    - Rotational deformity after phalangeal fracture
    - Mallet finger deformity
- Hold the hand and lift it to check proximal extensor surface of forearms and elbows for rheumatoid nodules and plaques of psoriasis.

2. Movement (Also assess neurological function looking at power, function and sensation)

Ask to move:

- *"Can you just make a fist for me? ... Straighten your fingers out."* To detect crepitus, place your index finger across the dorsum of patients fingers while they flex and extend them.

- *"... and now I would like you to bring your hand up like that ... and then down ... and from side to side .... and same on other hand."* Hold and elevate the wrist to allow movements freely and to feel the crepitus at wrist.
- *"Make a fist for me Please."* With the fingers flexed, look for the valleys in between the knuckles. These could be lost in the swellings of synovitis.
- *"... and now can you stretch your fingers out?"* Hyperextension of one or more fingers may indicate tendon rupture.
- *"Just let me move your fingers."* Investigate flexor tendon sheath abnormalities by passive movements of the fingers to see if you can illicit triggering or crepitus. Triggering is caused when a localised tendon swelling jams in one of the so-called pulleys (A1 pulleys) that guides the flexor tendons.
- *"... and now in this hand."* The finger will tend to jam in a flexed position resembling a gun trigger and requires an external or passive extending force in order to straighten.
- *"... and now can I ask you to press your hands together like that and make a prayer sign?"* This is a good test for the range of passive wrist extension.
- *"... and now flex in other way."* and flexion to look for symmetry of the elbow and shoulder positions. The normal range is 90 degrees in each direction.
- *"Bring the hands up to touch the shoulders."* Elbow flexion. Also Look at the elbows
- Supination and pronation.

Power (Small muscles of hands):

- *"I would like you to squeeze my two fingers with both of your hands."* to check grip strength index and middle fingers inserted into patients palms from thumb side.
- *"Now touch your thumb with your index finger, and don't let me break it .... And now each finger with your thumb like so."* thumb opposition for pincer grip to demonstrate fine motor functions in the hand.
- Abduction of the thumb
- *"Spread your fingers."* Abduction of fingers
- *"Grip this piece of paper between your fingers."* Adduction of fingers.
  (Froment's sign = flexion of the thumb during grip as ulnar nerve lesion prevents adduction)

Function:

- *"I would like you to pretend to write a sentence with your right hand ...... And now same with your left hand."*
- *"Can you undo a button?"*
- *"Can you pick up a coin?"*

Sensation:

- *"I am going to touch your hands with cotton, please say me yes when you feel it ...... Did it appear same on both side?"* — light touch
- *"I am now going to touch your hands with small pin, please say me yes when you feel it sharp ...... Did it appear same on both side?"* — Pin prick

Test little finger (ulnar), index finger (median) and anatomical snuffbox (radial) using light touch/pinprick.

3. **Feel** (examine each joint, palpating for tenderness, effusions and ???crepitus)

- *"I am going to palpate along with your fingers. Let me know if it is soar."* Palpate along each finger for swellings and tenderness. Hard swellings are normally bony outgrowths called osteophytes, characteristic of osteoarthritis. These are called Heberden's and Bouchard's nodes when they occur at DIP and PIP joints respectively. Hard swellings may also be due to mucous cysts or rarely due to tumours. Soft swelling suggests synovitis. Detect synovitis in interphalangeal joints by gently pressing with index fingers and thumbs above and below the joints to detect sponginess.

- *"I am going to palpate around your wrist ... Let me know if it is soar."* Palpate around the wrist for swelling and tenderness. Osteophytes of the thumb carpometacarpal joints can cause squaring of the wrist.

- *"I am going to gently squeeze again your hand... let me know if it is soar."* Gently squeeze across the metacarpal heads test for sponginess or tenderness.

- Palpate the flexor tendon sheaths in the hands and fingers to detect local tenderness or swelling. Also feel for thickening of palmar fascia. If you detect any swelling, look for triggering or locking during extension of a flexed finger.

Note:

- Consider examination of upper limbs and face.
- Don't forget to palpate the radial pulse

III. CASE PRESENTATION

1. Rheumatoid arthritis

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
  - Symmetrical deforming arthropathy of the small joints of hands involving PIP and MCP joints, with sparing of the distal IP joints.
  - Spindling of fingers at the PIP and MCP joints due to soft tissue swelling.
  - Palmar subluxation at MCP joints and ulnar deviation of the fingers.
  - The deformities present include
    - swan-neck deformities
    - Boutonniere's deformities, and
    - Z deformity of the thumb.
- **There are**
  - Nodules on the extensor surface of the forearm.
  - Generalized wasting of the small muscles of the hand.
  - Palmar erythema
  - Nail fold infarcts and vasculitic skin lesions.
  - There is a palpable flexor tendon nodule (say where) with resultant triggering of the finger.
  - The skin is thin and atrophic with purpura on the hands and arms.
  - There is no evidence of entrapment neuropathy.
- **The affected joints are warm, erythematous, and tender.**
- **The patient is unable to unbutton his/her clothes.**

So, based on this

- My **diagnosis** is rheumatoid arthritis.
- There is evidence of active inflammation and associated disability.
- I would like to examine for extra-articular manifestations of disease.

2. Ankylosing spondylitis

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
    - Severe kyphosis with a question mark posture.
    - Protuberant abdomen
- **There is decreased spinal movement, as evidenced by**
    - Decreased cervical movement in all directions along with increased occiput to wall distance.
    - Decreased chest expansion
- **There is no evidence of psoriasis.**

So, based on this

- My diagnosis is ankylosing spondylitis.
- I would like to perform the **modified Schober's test** to further assess spinal mobility.
- I would also like to examine for **aortic valve disease** and **lung fibrosis**, and
- ask about **heel pain.**

3. Psoriatic arthropathy

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
  - Asymmetrical arthropathy of the hands mainly involving the distal IP joints.
  - Nail pitting, onycholysis, transverse ridging, and subungual hyperkeratosis.
- **In addition, he has**
  - Well-defined erythematous plaques with silvery white scales over the extensor surfaces.

So, based on this

- My diagnosis is psoriatic arthropathy and psoriasis.

4. Gout

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
  - Asymmetrical deformity and swelling of the small joints of the hand.
  - Tophi in the hands and feet, and also in the ears, and an
  - Olecranon bursa

So, based on this

- My diagnosis is tophaceous gout.

5. Osteoarthritis

CASE PRESENTATION:

Well, I have examined this gentleman,

- **He has**
  - Asymmetrical bony swelling affecting the DIP and PIP joints
  - Squaring of the first MCP joint
  - Varus deformity of the knees, with associated effusions and crepitus
- **There is no evidence of synovitis or rash.**
- **The gait is**
  - antalgic, and
  - Trendelenburg's sign is positive, suggesting proximal weakness of hip stabilizers.

So, based on this

- My diagnosis is osteoarthritis

6. Systemic sclerosis

CASE PRESENTATION:

Well, I have examined this gentleman,

- **Over the face he has**
  - Sclerotic, smooth, shiny and tight skin
  - Loss of facial wrinkles
  - Perioral puckering with restrictive mouth opening
  - Nose appears pinched
  - Telangiectasia
- **On examination of the hands, there is**
  - Sclerodactyly with flexion deformities.
  - Dilated nail-fold capillaries with dystrophic nails
  - Digital ulceration and gangrene
  - Atrophy of soft tissue, in particular the finger pulps
  - Evidence of Raynaud's phenomenon
  - Palpable nodules of calcinosis

So, based on this

- My diagnosis is systemic sclerosis.

COMMUNICATION SKILLS AND ETHICS

A. GATHER APPROACH FOR COMMUNICATION SKILLS

▶ Greeting

- *(No greetings like good morning or nice to meet you, if breaking bad news)*
- *"Hello! Good morning. I am Dr___________, one of the doctor in _______________ department/clinic. Are you Mr/Mrs./Miss _________? Well, nice to meet you sir/madam."* ***OR***
- *"Hello! Good morning. I am Dr___________, one of the doctor in _______________ department/clinic. Are you Mrs. /Miss _________ daughter of Mr _____________? Well, nice to meet you madam."*
- *(While talking to a relative)* *OR*
- *"Well, I did not get a chance to introduce myself. I am Dr __________, one of the doctor in _______________ department/clinic. You must be Mr/Mrs./Miss _________ daughter/son of Mr___________? Right."*
- *(While talking to angry patient, let him speak and once stops then ask above)*
- *"Well, I understand that you were admitted with ___________ and some tests were done on you. Is that correct?"* ***OR***
- *"That must be difficult for you........we will try to sort it out?"* ***(For angry patient)***

▶ Agenda setting

- *"Well, I am here to discuss with you about your medical condition/tests and what we can do further. Is that Ok? Before I proceed further, will you tell me how you are feeling now?"*

Ask about privacy:

- *"Before I proceed further, let me tell you that I had a brief chat with Mr___________ and he has given me permission to talk to you about his health problem as this is a matter of confidentiality."* ***OR***
- *"Before I proceed further, let me tell you that I cannot discuss the finer and specific details about his health condition as this is a matter of confidentiality. However, we can have general discussion."* ***OR***
- *"Before I proceed further, will you tell me that, is this place, is this room quiet and comfortable, and whether can we carry out our discussion here? ..... Do you want any of your relative or the partner or the friend to be with you during this discussion as there is lot of information to share and it's very hard to remember everything for someone?"* ***OR***
- *"Are you comfortable to let your parents to join our meeting as they are waiting outside but let me tell you that it is a matter of confidentiality and we might discuss some sensitive issues as well?"* ***OR***
- *"Is that alright if I ask the nurse to come and sit with us during the discussion (In general)."* ***OR***
- *"So before I proceed further, it is preferable that I see you in the private first before bringing your parents in because I may ask you some important questions or some sensitive issues like drugs, alcohol which you may not want your parents to know about that... ok"*
- *" Did anybody mention with you about the possible cause of your problem? So, what do you think what the cause could be?"*

▶ Tell

- *"Well, I have results of your tests with me and it is showing that you are having ______________ disease which in medical field is called _________."* ***(Golden Silence)***
- *"Have you ever heard of this before? Or anybody has discussed with you about this. Do you want me to tell you about it?"*

When breaking bad news:

- *"Well, do you know when Mr___________ came here, he was in lot of distress and was having _____. Do you have any idea that _______________ is not a good sign?"*
- *"So, considering the severity of his condition we immediately gave him ______________ and did his tests including ____________ where we found _______________. I am afraid result of ___________ test is not a good news.* ***(Silence)*** *It showed that Mr____________ has ________________cancer."* ***(Golden Silence)***

▶ Help & Explain (Body of skill)

- Use all the information given in the scenario
- May draw pictures to make it more clear to the patient
- Encourage the patient to ask questions throughout the discussion
- Explore the concerns of the patient
- Respond accordingly in short chunks
- Keep asking the understanding of the patient throughout the discussion like by asking is that fine with you? Or Are you with me?
- Be alert to non-verbal communication as well
- Be honest i.e. don't try to be expert about which you don't know and tell it clearly

- *"I can arrange your meeting with my consultant, and he will be in a better position to answer your questions."*
- *"Do you have any other concerns you wish to talk about?"*
- *"I would like to say thank you for your time."*

▶ Referrals/Leaflets & societies

- *"I will book your appointment for/with ____________________ and will let you know before you leave."*
- *"I am also giving you information leaflets about ______________ to take home. You can find out more information about it from website or self-help groups on the internet as well."*

▶ Reassure

- *"Your consent and your wishes will be appreciated and as you will say we will do.... Take time to think."*

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Recall & follow ups with contact details

- *"Well, we can arrange a second meeting and we can discuss the matter again in the second meeting".*
- *"You can also talk to me on this contact number if you need further advice."*

Use following instead of medical jargons

- Nausea: feeling sick
- Vomiting: being sick or throwing up
- Malena: blood through the back passages
- Lung fibrosis: scaring of lung
- Valve stenosis: narrowing of valve
- Anaemia: low blood counts
- Intubate: passing a tube in the windpipe
- Haematoma: big blood clot
- Neurosurgeon: specialist for the brain

B. INFORMED CONSENT

Procedures

- Lumber Puncture (LP)
- Upper GI endoscopy (OGD)
- Colonoscopy
- ERCP
- PEG tube insertion
- Angiography
- Bronchoscopy
- Nephrostomy
- CVP line Insertion
- Pleural Biopsy
- Renal Biopsy
- Chemotherapy
- Radiotherapy

Others

- Decision for emergency surgery in intubated patient under the principles of best interest
- A competent patient's refusal of treatment with warfarin

1. Consent for lumbar puncture

Your role:	You are the doctor in emergency admission unit
Problem:	Dealing with idiopathic intracranial hypertension
Patient:	Miss Bushra Habib, 30 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A young female admitted with blurred vision. She was found to have bilateral papilledema, but CT Scan brain did not reveal any tumor. Diagnosis is thought to be idiopathic intracranial hypertension.

Your task: to explain her about idiopathic intracranial hypertension, offer and encourage her for lumbar puncture with CSF pressure measurement & therapeutic aspiration.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in emergency department. Are you Miss __________? Well, nice to meet you madam."*
- *"Well, I understand that you were admitted with blurred vision and scan of your brain was done. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the result of your scan and what we can do further for you. Is that ok. So, before I proceed further, will you tell me how you are feeling now?"*

▶ Tell

- *"Well, I have a good news for you. The scan of your head which was done is showing that there is no mass. This is an encouraging news for us."*

Q: What is wrong with me?

- *"The cause of your symptoms we think could be 'Idiopathic Intracranial Hypertension'."* ***(Golden Silence)***

▶ Help & Explain (Body of skill)

- *"Have you ever heard of this before, or anybody has discussed with you about this? Do you want me to tell you about it? ...... This is a condition in which there is increased pressure around the brain and spinal cord in the backbone due to increased fluid which put pressure on the back of the eyes. This could be the cause of your blurred vision."*

Q: Am I going blind?

- *"No, it is a treatable condition. But without treatment it can lead to blindness, constriction of visual fields and loss of colour vision."*

Q: What is the treatment for it?

- *"There are different ways to treat it including medical or surgical. Best possible way to diagnose and treat the condition is to have a lumbar puncture. Do you want me to tell about this?"*

Q: What is lumbar puncture?

- *"It is a procedure done to measure the pressure of fluid around the brain and spinal cord through a needle in the back."*

Q: I really don't want a needle in my back. Is there any alternative?

- *"The other options apart from treating the underlying cause (stopping offending drug like OCPs) include weight loss; acetazolamide / diuretics; and occasionally steroids. But the most effective treatment is serial lumbar puncture. Surgical treatment include* ***ventriculo-peritoneal shunt*** *and* ***Optic nerve fenestration*** *especially if there is progressive visual loss."*

Q: What would happen if I decide not to have the lumbar puncture?

- *"If your CSF pressure is found to be raised and you do not opt for treatment there could be permanent loss of your vision, loss of colour vision or constriction of visual fields if the condition is severe."*

Q: How should I prepare for my pleural biopsy?

Pre-procedure preparation

- Blood tests: Clotting profile, CBC (to check thrombocytopenia)
- CT scan / MRI Brain to rule out any SOL brain
- Stop blood thinning medications in consultation with concerned specialist to avoid uncontrolled bleeding:
  - Clopidogrel 7 days before (in emergency under platelet cover)
  - Warfarin (coagulation abnormalities to be corrected)
  - Aspirin can be continued
  - Safe platelet count > 80x 109/L
  - INR should be < 1.4

Q: What will happen during the procedure?

Procedure

- Signing of informed consent.
- Done while lying on left side with knees pulled up against chest (or in sitting position). Safest site is lower back.
- After cleaning the lower back with antiseptic, a local anaesthetic is injected to numb the area. It stings a little.
- A needle is then pushed through skin and tissues between two spine bones till spinal canal. The correctly placed needle enters a sac below the actual spinal cord. The fluid pressure is measured by attaching a special tube and if it is raised then certain amount of this fluid is removed to lower the pressure. The needle is then taken out and sticking plaster is applied over the entry site. The needle is usually in for about 1-2 minutes.
- Repeat procedure until pressure is returned to normal and symptoms relieved

Q: What can I expect after lumbar puncture?

Post-Procedure

- Keep lying on back for at least 4 hours to minimize post LP headache.

Q: What are the risks of having this procedure?

Risk and complications

The risks and complications include but are not limited to the following.

Common (>5 %):

- Backache: 2/3rd cases, lasting several days
- Shooting pain down the legs: 10% cases at the time of the procedure and usually settles on removing the needle.
- Bleeding: if taking blood thinning drugs.

Uncommon (1-5 %):

- Headache: lasting up to several days.

Rare (< 1 %):

- Bleeding: at the site of needle insertion or into the spinal canal.
- Lower limb weakness or numbness: temporary or permanent
- Double vision: short-lived

- Infection: at the needle site, may affect bones of the back or the spinal fluid. Death from meningitis can occur.
- Local problems from needle injury: implantation of skin cells resulting in local lumps or tumours (dermoid). They are harmless and may need surgical removal.
- Brain Herniation or Coning: can lead to death or severe disability. Risk is greatly reduced with a normal brain scan (CT or MRI).
- Death: ultra-rare.

Q: Could I end up paralyzed if you make a mistake?

- *"I appreciate your concerns. No, it is a safe procedure, and done usually at a level well below the spinal cord so chances of paralysis are very remote in general practice."*

▶ Reassure

- *"The procedure is carried out under strict hygienic (aseptic) conditions to minimize any risk of infection."*
- *"The procedure needs to be repeated every few days until CSF pressure is back to normal."*
- *"With treatment, the outcome is good, but it is important to have regular eye checks and spinal fluid pressure checks to minimize the risk of progressive visual problems."*
- *"Your consent and your wishes will be appreciated and as you will say we will do.... Take time to think."*
- *"You can change your mind about your decision at any time."*
- *"You can also seek a second opinion as well if you desire."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So, if you can just tell me what I have let you know so far especially about repeating the procedure .... So that I can add which might you miss?"*

▶ Referrals/Leaflets & societies

▶ Recall and follow ups with contact details

Consent

- If an adult patient lacks the mental capacity (either temporarily or permanently) to give or withhold consent for themselves, **no-one else can give consent on their behalf**. However, treatment may be given if it is in their best interests, as long as it has not been refused in advance in a valid and applicable advance directive.

Delegation of other healthcare professional to obtain consent by consultant in charge

- Responsibility for ensuring that informed consent has been given by the patient lies with the doctor who is going to carry out the procedure/examination or provide the treatment (not with the doctor who is delegated to obtain the consent). However, the consultant can delegate the healthcare professional to obtain consent if the healthcare professional:
  - understands the procedure
  - able to discuss the benefits and risks involved
  - understands about alternatives to the proposed investigation or treatment (as well as what will happen if the investigation or treatment is not done)
  - Received the appropriate training in the process of obtaining consent.

Criteria for a valid consent

- Patient should be competent
- Patient should be informed sufficiently about the proposed intervention
- Patient should give the consent voluntarily

Written consent

- Should be obtained in the following situations:
  - Surgery, invasive procedures or investigations
  - Procedures involving general /regional anaesthesia or sedation
  - Radiotherapy or chemotherapy

  - Use of unlicensed drugs
  - Research
  - If there is any reason to believe that provision of consent may be disputed later.

Consent Forms in UK

- **Consent Form 1:**
  For patients able to consent for themselves (everyone aged 16 or more is presumed to be competent to give consent. If a child below 16 has sufficient understanding and intelligence to enable him to understand fully what is proposed, then he or she will be competent. Young people aged 16 & 17 and legally competent younger children may themselves sign this form but may like a parent to counter sign as well unless they specifically ask not to do so. If physically unable to sign it then ask an independent witness to confirm the consent.
- **Consent Form 2:**
  Parents consenting on behalf of a child/young person below 18 years and does not have capacity to consent.
- **Consent Form 3:**
  Patient Parental agreement to investigation, treatment or procedure where consciousness not impaired.
- **Consent Form 4:**
  For patients who lacks capacity to consent for an investigation or treatment which is clinically judged as being in the patient's best interests (requires two clinicians to sign).

2. Consent for other medical procedures

Upper GI Endoscopy

Your role:	You are the doctor in gastroenterology ward
Problem:	Dealing with upper GI bleed (melena)
Patient:	Mrs. Shehnaz Baber, 60 years old lady

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A middle age lady admitted with blood through the back passage (melena) without any 'ALARM' symptom. Diagnosis is thought to be upper GI bleed due to meloxicam use. She has been transfused with 3 units of blood.

Your task: to explain her the likely cause and obtain an informed consent for upper GI endoscopy.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctors in the bowel ward. Are you Mrs. ____________? Well, nice to meet you madam."*
- *"Well, I understand that you were admitted with blood through your back passage and you were given some blood transfusion.... Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you the likely cause of your problem and what we can do further. Is that Ok? Before I proceed further, will you tell me how you are feeling now? (Do you have any more episodes of passing black stools or blood from the back passage? Has there been any bringing up (vomiting) with or without blood?)"*

▶ Tell

- *"The cause of your symptoms we think could be due to bleeding from your stomach or small bowel due to meloxicam you were taking."* ***(Golden Silence)***
- *"Have you been told about the possible reason for your symptoms or any proposed further investigations/ treatment?"*

▶ Help & Explain (Body of skill)

Q: Why you think I have been bleeding from my stomach?

- *"Your symptoms on admission and low blood counts on investigations were suggestive of either bleeding from stomach or small bowel which then needed to be corrected first with the blood transfusion. The most likely reason for the bleed would be an ulcer or inflammation around the stomach or small bowel and, in your case, the tablets you were taking (meloxicam)."*

Q: What can you do to stop the bleeding?

- *"The best test to diagnose and treat accordingly is upper GI endoscopy called the camera test. If there is any bleeding area, it might be injected with medications to stop further bleeding. Alternatively, you may be put on a course of anti-ulcer medication and/or antibiotics if required."*
- *"Have you ever heard about camera test before, do you know anyone who had undergone this procedure? Do you want me to tell about this?"*

Q: What is upper GI endoscopy?

- *"It is a test to look inside the gullet (oesophagus), stomach and first part of the bowel (duodenum) using a long thin flexible tube about the size of little finger having a light and camera at the tip to see inside *(endoscope). It has also a side channel down which various instruments can pass for various procedures. Any source of bleeding can be treated at the same time, if possible."*

Q: Is there any alternative?

- *"An upper GI barium x-ray is an alternative. It is a diagnostic but not a therapeutic test. Moreover, upper GI endoscopy provides direct visualization of caus."*

Q: What if I do not have upper GI endoscopy?

- *"The other potentially alarming causes will not be ruled out which will delay any possible treatment."*

Q: How can I prepare for upper GI endoscopy?

Pre-procedure preparation:

- Stop eating 06 hours before (preferably overnight) to avoid vomiting which can go into lungs (sips of water allowed up to 2 hours before). Procedure will be cancelled if these instructions are not followed.
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.

Q: What will happen during the procedure?

Procedure

- Signing of informed consent.
- Changing into a hospital gown. Remove any glasses or dentures.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure, antibiotic prophylaxis).
- Measurement of BP, heart rate and oxygen levels by attaching BP cuff, sensor on finger and stickers on chest.
- Lying on a couch in endoscopy room on left side, back of throat will be numbed with local anaesthetic spray, gel or by giving anaesthetic lozenges to suck. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax.
- Endoscope will be passed through a 'guard' in the mouth down the back of throat. You will be asked to swallow it. The endoscope will be pushed into food pipe and through the stomach into the upper intestine to see any abnormality. It will not cause any pain or interfere with breathing. Small samples (biopsies) of lining of the gut may be taken and sent to laboratory for seeing under the microscope. It is painless. The endoscope is then gently pulled out. You will usually stay in hospital overnight.
- The whole procedure takes about 10 minutes (02 hours for whole appointment).

Q: What can I expect after the colonoscopy?

Post-procedure

- Monitoring for 0.5-1 hour in Recovery Area. Do not eat or drink for 02 hours until the numbness in mouth or throat has completely worn off.
- May go home after 0.5-1 hours if everything goes uneventful (bit longer if sedated). Cannula will be removed before you leave. Do not stay alone overnight.
- Pain relief medications as prescribed.
- Do not drive, work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.
- Report will be written after the procedure. The result from any sample (biopsy) may take a few days.

Q: What are the risks of having upper GI endoscopy?

Risk and complications

I appreciate your concerns. This procedure is generally safe, but certain risks accompany any endoscopic procedure which include, but are not limited to the following:

- Perforation: especially if biopsy taken, polyp removed, or oesophageal dilatation.
- Bleeding: especially if biopsy taken or a polyp removed. May require endoscopy or surgery.
- Allergic reactions to sedatives/anaesthetic spray:
- Pain and discomfort: if not completely sedated.

  - Possible death. "Any immediate life-threatening events will be treated accordingly."
  - Sore throat, chest infection or pneumonia
  - Broken teeth

- *"Do you allow anyone directed by your consultant to treat you? This means you may be treated by resident doctor still in training?" If you refuse this will not affect your care and treatment in a negative way."*
- *"Do you consent to allow to record video or take images of bowel if it will help determine the proper treatment?"*
- *"Do you allow your provider to remove tissue for testing and to treat any growths or cancers that can be treated with the instrument?"*
- *"Do you understand that there are no guarantees about the results of the upper GI endoscopy, and the procedure will not cure medical conditions?"*
- *"Do you allow your medical provider to treat you if anything immediate and life-threatening occurs during the procedure?*

▶ Reassure

- *"The procedure is carried out under strict hygienic (aseptic) conditions to minimize any risk of infection."*
- *"You have a right to seek a second opinion as well."*
- *"You can change your mind about a decision at any time."*
- *"Your consent and your wishes will be appreciated and as you will say we will do.... Take time to think."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Referrals/Leaflets

▶ Recall and follow ups with contact details

Colonoscopy

Q: What is colonoscopy?

- It is examination of large bowel (colon) through back passage using an instrument called colonoscope. Colonoscope is a thin, flexible telescope with a light and a camera over the tip. Small tissue samples (biopsies) may be taken during the procedure and will be sent to laboratory for examination under a microscope.

Q: Why do I need a colonoscopy?

- For diagnosing the cause of symptoms
- To evaluate abnormal X-ray or scan
- For polyp removal (protrusion from the lining of bowel; attached by a stalk like a mushroom or flat without a stalk)

Q: What if I do not have the colonoscopy?

- If you do not have colonoscopy, it will be harder to diagnose illness or screen for cancer.

Q: What are the alternatives to colonoscopy?

- **Barium enema:** "Examination by taking X-rays after putting dye in rectum. Colonoscopy may again be required for tissue diagnosis."
- **CT scan:** Tissue samples can't be taken which may be important for diagnosis. Colonoscopy may again be required for tissue diagnosis.

Q: How can I prepare for colonoscopy?

Pre-procedure preparation (Gut preparation):

- Gut preparation starts 2-4 days before colonoscopy to ensure thorough cleaning for a complete examination.
- Start low fibre diet 02 days before (white fish, chicken, eggs, cheese, white bread or potato without skins)
  Drink plenty of fluids (cup every 30 minutes)

Avoid high fibre foods (fruit, vegetables, salad, cereals, nuts, wholemeal foods, and red meat)

For morning appointment:

- Low fibre breakfast day before colonoscopy
- Drink only plenty of clear fluids later (water, fruit juice / squash, fizzy drinks, tea or coffee without milk)
- Take 10 Senna tablets at 2 PM
- 1st Citramag sachet at 4 PM (dissolve in 200 ml of hot water and drink once cooled)
- 2nd Citramag sachet at 7 PM (dissolve in 200 ml of hot water and drink once cooled)
- Stop oral fluids 2 hours before

For afternoon appointment:

- Light low fibre lunch at 12 midday day before colonoscopy
- Take 10 Senna tablets at 4 PM
- 1st Citramag sachet at 6 PM
- 2nd Citramag sachet at 7 AM on procedure day
- Alternatively, enema is given one night before the procedure

- Do not take tablets for DM in the morning. Reduce or stop morning insulin as well. Rest of medications to be taken 2 hours before with sip of water (Do bring all the prescribed medications or their list including over the counter drugs, herbal remedies and supplements).
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.

Q: What will happen during the procedure?

Procedure

- Signing of informed consent
- Changing into a hospital gown
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure)
- Measurement of BP, heart rate by attaching BP cuff and a sensor on finger
- Lying on left hand side in the endoscopy room. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax
- The colonoscope will be moved through the back passage along the length of large bowel. Colon is inflated with air for better visualization which may cause bloating. Small samples (biopsies) of lining of the colon may be taken and sent to laboratory for seeing under the microscope. Polyp, if found can also be removed. At the end of procedure, colonoscope is pulled out.
- Procedure takes about 20-30 minutes (02 hours for whole appointment).
- **Virtual colonoscopy** (CT colonoscopy or colonography): Placement of thin tube into back passage. Insufflation of large bowel with air. Clear CT images of large bowel are taken.

Q: What can I expect after the colonoscopy?

Post-procedure

- Monitoring for 1-2 hours in Recovery Area. Can eat or drink soon after procedure.
- May go home after 1-2 hours if everything goes uneventful (bit longer if removal of small tissue lumps - polyps). Cannula will be removed before you leave. Do not stay alone overnight.
- Pain relief medications as prescribed.
- Do not drive, work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.
- Report will be written after the procedure. The result from any sample (biopsy) may take a few days.

Q: What are the risks of having a colonoscopy?

Risk and complications

Risks and complications with this procedure include, but are not limited to the following:

- **Common:**
    - Sleepiness (dizziness), feeling faint, tiredness, headaches
    - Temporary 'week or numb' feeling in arm due to positioning during the procedure
    - Tummy pain: can last up to 5 days.
    - Nausea and vomiting
    - Leakage of liquid accompanied by gas for up to 24 hours after taking the last dose of laxatives.
    - Bloating or cramping due to air insufflation during the procedure. Moving around will help.

- **Uncommon:**
    - Blood from back passage (if biopsy taken or polyp removed): 1 in 100 people
    - Bowel perforation: 1 in 1000 people
- **Rare:**
    - Blood infection (Bacteraemia)
    - Allergic reaction to the drugs used
    - Stroke

Endoscopic Retrograde Cholangiopancreatography (ERCP)

Q: What is an ERCP?

- It is used to take detailed x rays of pancreas and bile ducts by injecting special dye in bile ducts using a long flexible tube (endoscope) passed through mouth, gullet (oesophagus) and stomach into the upper part of small intestine (duodenum).

Q: Why do I need an ERCP?

- For diagnosis and treatment of disorders of bile ducts and pancreas causing jaundice or pancreatitis.

Q: What treatment can be done during an ERCP?

- **Sphincterotomy:** Widening of bile duct opening with an electrically heated wire (diathermy) to either grab gall stone by a basket or let it to be passed out with stools.
- **Stenting:** Placing of a short tube (stent) in narrowed portion of bile duct to allow bile to drain into bowel again.

Q: Is there any alternative?

- Magnetic Resonance Cholangiopancreatography (MRCP) is an alternative used only for diagnostic purpose. It does not allow any treatment if required.

Q: How can I prepare for ERCP?

- Inform if pregnant. It may still be possible to perform ERCP providing certain precautions are taken. Alternatively, it may be possible to delay it or use another type of procedure.

Pre-procedure preparation

- Stop eating 06 hours before (preferably overnight) to avoid vomiting which can go into lungs (sips of water allowed up to 2 hours before). Procedure will be cancelled if these instructions are not followed.
- Stop blood thinning medications in consultation with concerned specialist to avoid uncontrolled bleeding:

Conditions with low risk of thrombosis (IHD without stents, VTE > 3 months ago)

- Clopidogrel 7 days before
- Warfarin 5 days before (bridging with heparin not required)
- Rivaroxaban & Apixaban 2 days before
- Aspirin continued & stopped on procedure day

('INR' blood test 1-2 days before: should be below 1.5, otherwise procedure will be cancelled)

Conditions with high risk of thrombosis (IHD with stents, prosthetic valves, AF with previous stroke/TIA, recent VTE < 3 months, thrombophilia)

- Seek cardiologist advise for aspirin and clopidogrel
- Warfarin 5 days before and bridge with heparin

- Take Regular prescription medication as usual.
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.
- May go home same day (if only X-ray pictures taken) but bring an overnight bag with toiletries, dressing gown and nightwear as overnight stay may be required (if stenting or removal of gall stones).

Q: What will happen during the procedure?

Procedure

- Signing of informed consent.
- Changing into a hospital gown. Remove any glasses or dentures.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure, antibiotic prophylaxis).
- Measurement of BP, heart rate and oxygen levels by attaching BP cuff, sensor on finger and stickers on chest.

- Lying on a couch in endoscopy room on left side, back of throat will be numbed with local anaesthetic spray, gel or by giving lozenges to suck. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax.
- Endoscope will be passed through a 'guard' in the mouth down the back of throat into food pipe and through the stomach into the upper intestine. It will not cause any pain or interfere with breathing. A special dye will be injected into bile duct and detailed x-rays of pancreas and bile ducts will be taken. Stenting or sphincterotomy will be done if required. The endoscope is then gently pulled out. You will usually stay in hospital overnight.
- The whole procedure last 15-60 minutes.

Q: What happens after ERCP?

Post-procedure

- Monitoring for 2-4 hours in Recovery Area. Do not eat or drink for 02 hours until the numbness in mouth or throat has completely worn off.
- May go home after 2-4 hours if everything goes uneventful (few days hospital stay if insertion of a small wire mesh or removal of gallstone). Cannula will be removed before you leave. Do not stay alone overnight.
- Pain relief medications as prescribed.
- Do not drive, work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.

Q: What are the common risks of ERCP?

Risks and complications:

Risk is greater in therapeutic ERCP than diagnostic ERCP. Risks and complications include but are not limited to the following.

- Damage to crowned tooth or dental bridgework
- Reaction to sedative drugs
- Allergic reactions to dye: rare
- Bile duct infection (cholangitis): rare
- Bleeding (from sphincterotomy site): 3%
- Intestinal perforation: 0.2%
- Pancreatitis (inflammation of pancreas)
- Aspiration pneumonia

Percutaneous endoscopic gastrostomy (PEG) feeding tubes

Q: What does PEG stand for?

- Percutaneous means through the skin, endoscopic means using flexible camera and gastrostomy means opening into the stomach. It is a small feeding tube which goes through the skin directly into the stomach.

Q: Why a PEG tube is needed?

- To provide long term nutritional support if there is
  - Inability to pass NG tube due to obstruction.
  - Unsafe swallowing: acute stroke (after 14 days), chronic progressive neuromuscular disease.
  - Inability to take feed: Dementia, malignancy of food pipe or back of throat

It will not alter the outcome of underlying disease.

Q: What are the contraindications of inserting a PEG tube?

Contraindications

- **Absolute**
  - Coagulopathies
  - Thrombocytopenia (platelet < 50×10^9/L)
  - Shock, sepsis
  - Perforated viscus
- **Relative**
  - Previous gastric surgery, peritonitis, ascites, gastric outlet obstruction.

Q: Are there any alternatives?

- Nasogastric tube

Q: How can I prepare for a PEG tube?

Pre-procedure preparation

- Blood clotting test, MRS.A screening test
- Stop blood thinning medications in consultation with concerned specialist to avoid uncontrolled bleeding.
- Stop eating 06 hours before to avoid vomiting which can go into lungs (clear fluids allowed up to 2 hours before).
- Prescribed medications to be taken 2 hours before with sip of water. (Do bring all the prescribed medications or their list including over the counter drugs, herbal remedies and supplements)
- Bring an overnight bag with toiletries, dressing gown and nightwear for overnight stay.

Q: What happens during the procedure?

Procedure

- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure, antibiotic prophylaxis).
- Measurement of BP, heart rate and oxygen levels by attaching BP cuff, sensor on finger and stickers on chest.
- Lying on left hand side in the endoscopy room. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax.
- Mouth guard is placed to protect accidental biting of tongue or endoscope. A thin black tube containing a camera and a bright light (endoscope) is passed through the mouth guard, over the back of the tongue into stomach. Stomach is insufflated with air. Most transluminant point on anterior abdominal wall is marked. Skin is sterilized and local anaesthetic is injected. Incision is made and a trocar with a needle is pushed through skin into the stomach under complete endoscopic visualization. A thread is inserted through the trocar after removing the needle and this thread is then snared. The endoscope is then withdrawn with the snare holding the thread. A suitably sized PEG tube is then connected to the thread and pulled out from skin incision through the stomach and secured. The correct positioning is confirmed by endoscopy. A small dressing is placed over the tube.
- The whole procedure takes 20-30 minutes.

Q: What happens after the procedure?

Post-procedure

- Monitoring for 2-4 hours in Recovery Area.
- Pain relief medications as prescribed.
- Start feeding 04 hours post procedure. Give clear fluid initially till 24 hours. If tolerating well, start specially prepared liquid feed containing all required nutrients and calories (protein, fat, vitamins and minerals) by attaching a syringe or electronic feeding pump as per instructions of dietician and nutrition nurse specialist. Give medications in liquid form if unable to swallow in consultation with pharmacist (avoid clogging up of tube). Flush well after each use to avoid blocking. Store monthly supplies of liquid feed, syringes and giving sets at suitable place at home.
- Take only shower or wash with a cloth for first 02 weeks. Later can have bath or swimming after clipping the tube.
- Removal of PEG once able to eat and drink enough and safely either endoscopically or by cut and push method. Some patients will require it for prolong period. (Tube life 9 months to 02 years. FREKA PEG tubes can last for a few years due to compatibility with the human body).

Q: What are the benefits of having a PEG tube?

Benefits

- Well tolerated (better than NG tubes)
- Easier to manage than passing a thin tube via the nose into the stomach (NG tube)
- Improve nutritional status
- Reduction in aspiration pneumonia
- Cost-effective if required for prolong period
- More comfortable due to invisibility

Q: Are there risks or complications?

Risks and complications:

Risks and complications include but are not limited to the following.

- **Common**
    - Sore throat
    - Soreness in stomach, bloating
    - Nausea and vomiting

- **Uncommon**
    - Vomit going into lungs causing pneumonia
    - Bleeding
    - Damage to abdominal organs
    - Damage to teeth, jaw and crowned or dental bridgework
    - Temporary 'week or numb' feeling in arm due to positioning with the procedure
    - Unsuccessful procedure
    - Infection of stoma, peritonitis
- **Rare:**
    - Infection of blood (Bacteraemia)
    - Allergy to medication given during procedure
    - Death

Coronary angiography

Q: What is a coronary angiogram (cardiac catheterisation)?

- A procedure used to look inside blood channels of heart (coronary arteries) for any narrowing or blockages. It also provides important information about the structure and function of heart. It uses x-rays and special dye (contrast).

Q: Why am I having a coronary angiogram?

- To evaluate: ECG changes, chest pain due to restricted blood supply of heart (angina), heart attack patients for narrowing of blood channels of heart (coronary artery disease)
- For placing stents in narrowed blood channels of heart to restore their patency (CABG is required for severe narrowing).
- To investigate inherited (congenital) heart diseases.
- To assess effectiveness of heart pumping, and pressures inside heart before surgery or a procedure.

Q: Are there any alternatives?

- CT coronary angiogram also shows blood flow through coronary arteries. Dye is injected into a small vein in arm rather than an artery in groin or wrist. It is less invasive but generally not as effective at detecting areas that have narrowed in small coronary arteries or in small branches. The standard coronary angiogram is still the best way of diagnosing coronary heart disease.

Q: How can I prepare for a coronary angiogram?

(Inform the doctor if pregnant)

Pre-procedure preparation

- Stop blood thinning medications (warfarin & rivaroxaban) 2-3 days before in consultation with concerned specialist to avoid uncontrolled bleeding.
- Take shower in the morning to reduce risk of infection and shave both groins as well.
- Take a light breakfast before 6 am but do not eat after that (water allowed up to the time of procedure).
- Do not take tablets for DM including metformin-containing medicines in the morning. Reduce or stop morning insulin as well. Rest of medications to be taken 2 hours before with sip of water. (Do bring all the prescribed medications or their list including over the counter drugs, herbal remedies and supplements)
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.
- Blood test and ECG

Q: What happens during a coronary angiogram?

Procedure

- Admission to 'cardiac day care unit'.
- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure).
- Measurement of BP, heart rate, oxygen levels and ECG tracing by attaching BP cuff, sensor on finger and stickers on chest.
- Lying on a couch in in a cardiac catheter laboratory. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax.

- Injection of local anaesthetic to numb the skin. It stings a little. A small cut will be made in your wrist or groin. A hollow tube (sheath) is inserted through the cut. A long, thin, flexible tube (catheter) is then passed through the sheath into blood vessel. The catheter tip will be passed up to the heart and coronary arteries under low-dose X-ray images guidance. A dye (contrast) is injected into the catheter and X-ray images (angiograms) are taken. It will show narrowed coronary arteries. The catheter is then removed. Stitches are applied if inserted through the cut. Needle insertion site will be pressed for 10 minutes to prevent any bleeding.
- An occasional 'missed' or 'extra' heartbeat may be felt during the procedure. The dye may give you a hot, flushing feeling when it is injected.
- The whole procedure takes approximately 30 -60 minutes.

Q: What happens after a coronary angiogram?

Post-procedure

- Monitoring for 2-4 hours in post catheterisation area.
- May go home after 2-4 hours if everything goes uneventful. Cannula will be removed before you leave. Do not stay alone overnight.
- Pain relief medications as prescribed.
- Do not drive for 03 days if procedure performed via wrist and for 05 days if performed via the top of your leg. Do not work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.
- Removal of stitches after 7 days.

Q: What are the risks of this procedure?

Risks & Complications

There are risks and complications with this procedure. They include but are not limited to the following.

- **Common (> 5%):**
    - Bruising or swelling at puncture site.
    - Infection of the wound.
    - Loss of arm pulse: if radial artery used.
- **Rare (< 1%):**
    - Heart rhythm disturbance: may need DC shock.
    - Allergic reaction to the X-ray dye:
    - Loss of kidney function: due to dye.
    - Stroke
    - Heart attack /angina pain
    - Death

Bronchoscopy

Q: What is a bronchoscopy?

- Examination of the breathing passages (airways) of lungs with a thin tube-like instrument having a camera at its tip (bronchoscope). Used for taking samples of tissues (biopsies) or mucus from inside lungs or removing an inhaled foreign body.
- **A fibre-optic bronchoscope:** thin, flexible. Used under sedation.
- **A rigid bronchoscope:** thin, straight. Requires a general anaesthetic.

Q: Why do I need a bronchoscopy?

- To find out the cause of:
    - Infection & recommend appropriate treatment
    - Coughing up of blood
    - Abnormal CXR or CT scan
    - Persistent cough

Q: Is there an alternative test that I can have instead of the bronchoscopy?

- There is no alternative way. Breathing tests, X-rays / CT scans of lungs give information about lungs but do not allow to look inside breathing passages and collect samples.

Q: How should I prepare for my bronchoscopy?

Pre-procedure preparation

- BP measurement at GP practice 2-3 days before to confirm adequate control.
- Stop eating 06 hours before to avoid vomiting which can go into lungs (sips of water allowed up to 2 hours before). Procedure will be cancelled if these instructions are not followed.
- Stop blood thinning medications in consultation with concerned specialist to avoid uncontrolled bleeding:
  - Clopidogrel 7 days before
  - Warfarin 5 days before
  - Rivaroxaban & Apixaban 2 days before
  - NSAIDS 2 days before
  - Aspirin on the day of procedure

  ('INR' blood test 1-2 days before: should be below 1.5, otherwise procedure will be cancelled)
- Do not take tablets for DM in the morning. Reduce or stop morning insulin as well. Rest of medications to be taken 2 hours before with sip of water. (Do bring all the prescribed medications or their list including over the counter drugs, herbal remedies and supplements)
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.

Q: What will happen on the day?

Procedure

- Admission to 'pulmonology day care unit'.
- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure).
- Measurement of BP, heart rate and oxygen levels by attaching BP cuff, sensor on finger and stickers on chest.
- Lying on a couch in bronchoscopy room, nose & throat will be numbed with local anaesthetic gel or spray. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax.
- Bronchoscope will be passed through one of nostrils or a 'guard' in the mouth down the back of throat into breathing passages. Voice box and breathing passages will be further numbed using local anaesthetic. Breathing passages will be examined and samples may be taken including:
  - **Saline washings (salty water):** by flushing through the bronchoscope and sucking out again to collect cells for analysis.
  - **Brushings:** by brushing cells from the lining of the air ways.
  - **Biopsy with forceps:** small pieces of tissue can be taken by passing a pair of forceps (tweezers) on the end of a wire down the bronchoscope.
  - **Needle biopsy:** sample from enlarged lymph glands can be taken by passing a needle down the bronchoscope under endobronchial USG guidance.
- The bronchoscope is then gently pulled out. The biopsy samples are sent to laboratory for testing.
- Bronchoscopy lasts 20 - 40 minutes. Endobronchial ultrasound bronchoscopy for lymph nodes sampling lasts 60-90 minutes.

Q: What happens after the bronchoscopy?

Post-procedure

- Monitoring for 2-4 hours in Recovery Area. Do not eat or drink for 02 hours until the numbness in mouth/throat has completely worn off. A CXR will be done to make sure absence of puncture in lung wall.
- May go home after 2-4 hours if everything goes uneventful and a CXR is normal. Cannula will be removed before you leave. Do not stay alone overnight.
- Pain relief medications as prescribed.
- Do not drive, work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.
- Contact your doctor if
  - Short of breath
  - Chest pain
  - Coughing up > a tablespoon of blood in one go.

Q: When will I get the results of bronchoscopy?

Results

- After 8-15 working days. Make an appointment to see the doctor in the Chest Clinic to pick up results before leaving the hospital.

Q: Are there any risks or complications?
Risks and complications

Bronchoscopy is a generally safe procedure. Serious complications are rare but are not limited to following:

- **Mild**
    - Fever: 1 in 3 people
    - Sore throat or hoarse voice
    - Minor bleeding: if biopsy is taken.
    - Nosebleed
- **Moderate**
    - Lung puncture: 1 in 10 people if 'transbronchial biopsy' is carried out resulting in breathless.
    - Significant bleeding
- **Serious complications**
    - Death: 1 in 10,000

Percutaneous nephrostomy

Q: What is a percutaneous nephrostomy?

- Insertion of a fine plastic tube (catheter) through the skin into the kidney to drain urine into a bag. Percutaneous means through skin and nephrostomy means inserting tube into kidney. It is done to preserve kidney function by relieving pressure of urine due to blocked ureter (tube that drains urine from kidneys into bladder). An operation may become necessary otherwise. It may be placed for a short time (stone passes naturally), or for a much longer period till a permanent solution

Q: Why do I need a percutaneous nephrostomy?

- Tests have shown that the tube leading from kidney to the bladder has become blocked. The cause of the blockage is not obvious. If left untreated, your kidney will become damaged.

Q: Is there an alternative to this procedure?

- Insertion of an internal stent under general anaesthetic.

Q: What are the benefits of this procedure?

- It saves from having a larger operation.

Q: Who has made the decision and who will be doing it?

- The doctors in charge of case and radiologist after discussion feel that this is the best treatment option.
- A specially trained doctor called a radiologist have special expertise in using X-ray, scanning equipment, and interpreting the images. They are the best trained people to insert and place correctly the needles and fine tubes into the body through skin, by looking at the images during the procedure.

Q: How do I prepare for percutaneous nephrostomy?
Pre-procedure preparation

- Stop eating 04 hours before to avoid vomiting which can go into lungs (sips of water allowed up to 2 hours before).

Q: What happens during a percutaneous nephrostomy?
Procedure

- Admission in the hospital.
- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication).
- Attachment of BP, heart rate and oxygen levels monitoring device to chest and finger.
- Lying flat on stomach on the X-ray table in a special procedure room in X-ray department or operation theatre as guided.
- Skin cleaning with antiseptic and draping with a theatre towel.
- Selection of suitable point (back just below 12th rib) using USG machine.
- Injection of local anaesthetic to numb the skin. It stings a little.

- Insertion of a fine needle into the kidney in a satisfactory position. Placement of a guide wire through the needle into the kidney. Placement of plastic catheter over the guide wire. Fixation of catheter to the skin surface and attachment of a drainage bag.
- Whole procedure takes 20 - 90 minutes.

Q: What happens after percutaneous nephrostomy?

Post-procedure

- Monitoring for 2-4 hours in Recovery Area.
- May go home after 2-4 hours if everything goes uneventful. Cannula will be removed before you leave. Do not stay alone overnight.
- Pain relief medications as prescribed.
- Do not drive, work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.
- Avoid sudden movements without remembering about the bag.
- Place a sterile dressing where the tube leaves your skin to prevent infection. Change dressing at least twice a week.
- No shower or bath before 48 hours. Wrap with plastic during showering or bathing to protect skin. Shower without any protection after 14 days. Swimming is not recommended as long as the tube is in place.
- Frequently empty drainage bag. Change weekly.

Q: Are there any risks or complications?

Risks and complications

Percutaneous nephrostomy is a very safe procedure, but there are some risks and complications that can arise, as with any medical treatment.

- **Common (> 1 in 10)**
  - Minor bleeding in urine
  - Mild discomfort
- **Occasional (between 1 in 10 and 1 in 50)**
  - Urine leakage inside the abdomen
  - Blockage of drainage tube
  - Generalised infection (septicaemia)
- **Rare (less than 1 in 50)**
  - Significant bleeding inside the abdomen
  - Displacement of the drainage tube
  - Failure to place the tube satisfactorily
  - Damage to adjacent organs (stomach, bowel)
  - Hospital acquired infection

Central Venous Line Placement

Q: What is a Central Vascular Access Device?

- It is used to give medication directly into blood stream without repeatedly inserting a needle into vein.

Types of catheter (select basing on type & length of treatment):

- **Non-Tunnelled:** central line, Vascath.
- **Tunnelled:** Hickman, Permacath Dialysis Catheter
- **Implantable Port:** Portacath, Infusaport.

Q: Why do I need a central line?

- Central lines are needed if veins are not accessible in the arms or repeated cannulation is required or there is risk of damage to the smaller veins due to certain medications. These lines can also be used to give fluids, antibiotics or draw blood samples for tests.

Q: How do I prepare for procedure?

(Inform the doctor if pregnant or breast feeding as it may effect medication to be given during procedure)

Pre-procedure preparation

- Blood clotting test
- Stop alcohol and recreational drugs 24 hours before as these may affect sedation anaesthetic.
- Stop eating 04 hours before to avoid vomiting which can go into lungs (sips of water allowed up to 2 hours before).

- Stop blood thinning medications in consultation with concerned specialist to avoid uncontrolled bleeding:
    - Clopidogrel 7 days before
    - Aspirin 7 days before
    - Warfarin 5 days before
    - Rivaroxaban & Apixaban 2 days before
    - NSAIDS 2 days before
- Do not take tablets for DM in the morning. Reduce or stop morning insulin as well. Rest of medications to be taken 2 hours before with sip of water. (Do bring all the prescribed medications or their list including over the counter drugs, herbal remedies and supplements)
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.
- May go home same day but bring an overnight bag with toiletries, dressing gown and nightwear as overnight stay may be required.

Q: What actually happens during the procedure?

Procedure

For All Devices

- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication).
- Selection of a suitable vein for catheterisation (base of neck or groin).
- Local anaesthetic injection will be given to numb the skin over the vein. It stings a little. Sedation medication will be given into the cannula by an injection to make you feel sleepy and relax.
- A small cut will be made in the skin over the vein. The needle is passed through this cut into the vein under USG guidance. The catheter tip is positioned under x-ray guidance in a major blood vessel next to the heart. The catheter is held in place with sutures. Dressings is applied.
- CXR to confirm correct placement of catheter.

Non-Tunnelled Catheter

- Catheter inserted directly into the vein. It can stay in for about a week.

Tunnelled Catheter

- Small cut is made in the skin on chest and catheter is pushed (tunnelled) under skin until it reaches the vein to be entered. Tunnelled catheter can stay in for months.

Implantable Port

- Inserted entirely under skin. Catheter is pushed (tunnelled) under skin until it reaches the vein to be entered. Implantable ports can stay in for months or even years.

Q: What are the safety issues when you leave the hospital?

Post-procedure

- Monitoring for 2-4 hours in Recovery Area.
- May go home after 2-4 hours if everything goes uneventful and CXR is satisfactory. Cannula will be removed before you leave. Do not stay alone overnight after central venous line placement.
- Pain relief medications and ice packs as prescribed.
- Do not drive, work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.
- Take care not to pull on device. Notify immediately if device has been tugged or fallen out.
- Go to nearest Emergency Department or GP if have;
    - Fever
    - Redness of skin around catheter
    - Swelling in the arm

Q: Are there any risks or complications?

Risks and complications

Risks and complications can include but are not limited to the following.

- **Common:**
    - Pain
    - Bleeding or bruising
    - Infection: require device removal.

  - Catheter kinking: require repositioning or removal.
  - Blocking: may require blood thinning medications or removal.
  - Accidental removal
- **Less common:**
  - ***Pneumothorax***: collection of air around the lining of the lungs. It resolves by itself but may require a tube insertion into the chest.
  - ***Damage to surrounding structures:*** blood vessels, nerves, organs and muscles.
  - ***Failure to gain access to the vein***
- **Rare:**
  - Fast or irregular heartbeat
  - Air bubble entry into blood stream: can travel to heart causing a heart attack or to brain causing a stroke.
  - Seizures/cardiac arrest: due to local anaesthetic.
  - Death: very rare.
- **If sedation is given:**
  - Faintness or dizziness
  - Fall in BP
  - Nausea and vomiting
  - Heart attack
  - Vomit in the lungs causing pneumonia
  - Stroke

Pleural biopsy (USG guided)

Q: What is an ultrasound guided pleural biopsy?

- It is used to take samples (biopsies) of the inner lining of chest (pleural membranes) using a special biopsy needle under USG guidance. Samples are then looked under microscope by a specialist doctor (pathologist) in a laboratory.

Q: Why do I need a pleural biopsy?

- To find out the cause of your illness and guide further management with your best interests in mind.

Q: Is there an alternative test that I can have instead of the pleural biopsy?

- Alternative ways of getting pleural biopsies is called thoracoscopy using a special camera (thoracoscope). It is more invasive test. It is not suitable for everyone.

Q: How should I prepare for my pleural biopsy?

(Inform the doctor if pregnant or breast feeding as it may effect medication to be given during procedure)

Pre-procedure preparation

- BP measurement at GP practice 2-3 days before to confirm adequate control.
- Stop eating 06 hours before to avoid vomiting which can go into lungs (sips of water allowed up to 2 hours before).
- Stop blood thinning medications in consultation with concerned specialist to avoid uncontrolled bleeding:
  - Clopidogrel 7 days before
  - Warfarin 5 days before
  - Rivaroxaban & Apixaban 2 days before
  - NSAIDS 2 days before
  - Aspirin on the day of procedure
- Do not take tablets for DM in the morning. Reduce or stop morning insulin as well. Rest of medications to be taken 2 hours before with sip of water. (Do bring all the prescribed medications or their list including over the counter drugs, herbal remedies and supplements)
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.

Q: What will happen on the day of procedure?

Procedure

- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication during the procedure).
- Blood pressure, heart rate and oxygen levels measurement.

- Local anaesthetic will be injected to numb the skin on your chest wall. It stings a little.
- A small cut will be made in the side of chest. The biopsy needle is passed through this cut using USG machine. Several biopsies will be taken. You will hear a click when each sample is taken.
- Needle is removed at the end and plaster applied which can be removed after two days.
- The whole procedure takes about 30 - 60 minutes.

Q: What happens after the pleural biopsy?

Post-procedure

- Monitoring for two hours in Recovery Area.
- Chest X-ray to rule out any complication.
- May go home after 02 hours if everything goes uneventful and CXR is satisfactory. Cannula will be removed before you leave. Take rest for the remainder of the day and next day. Do not stay alone overnight after biopsy.
- Pain relief medications as prescribed.
- Do not work, operate machinery, drink alcohol, sign any legal documents or be responsible for small children for 24 hours after the procedure if given sedatives as it can affect your judgement and behaviour slightly.

Q: Can anything go wrong?

Risks and complications

- Pain
- Infection
- Bleeding
- Lung damage: Small risk of damage to the lung causing air leak into the space around the lung. No specific treatment is required but may rarely require insertion of a small tube into this collection to drain it away.
- Risk to life with pleural biopsy is very less (< 1 in 1,000).

Q: When will I get the results of biopsy?

- After 8-15 working days. Make an appointment to see the doctor in the Chest Clinic to pick up results before leaving the hospital.

Renal biopsy (USG/ CT guided)

Q: Where are the kidneys?

- Kidneys are broad bean shaped organs about the size of a mango lying at the back of tummy in front of the lower two ribs. A transplant kidney lies in right or left lower tummy.

Q: What is a kidney biopsy?

- It is a used for taking samples of kidney tissue for examining under microscope by a specialist pathologist. Each sample is about the size of half a matchstick. As disease affects both kidneys together, therefore biopsy is taken from one kidney only.

Q: Why do I need a kidney biopsy?

- To diagnose exact cause of kidneys disease when other tests failed to do so, and to advise best treatment.

Q: What are the benefits of having a renal biopsy?

- It will help to make a correct diagnosis and to plan further treatment.

Q: Are there any alternatives?

- No.

Q: Who will be performing the biopsy?

- A specially trained doctor called an interventional radiologist using ultrasound or CT scan machine to place the biopsy needle accurately into the kidney.

Q: Is there any preparation needed before the biopsy?

Pre-procedure preparation

- Scan of kidneys, blood clotting test and BP measurement 02 weeks before.
- Stop blood thinning medications 07 days before (in consultation) to reduce chance of bleeding.
- May go home same day but bring an overnight bag with toiletries, dressing gown and nightwear as overnight stay may be required.

- Small breakfast on procedure day if biopsy of own kidney (as lying on tummy). Normal breakfast if biopsy of transplant kidney (as lying on back)
- Arrange for someone to bring you in and take you home from the hospital. Do not drive or go home on public transport rather to be taken by car to avoid complications and quicker return to hospital if any complication.

Q: What happens during the biopsy?

Procedure

- Admission to 'renal day care unit'.
- BP measurement, blood & urine tests (postponed to another date if BP is too high or urinary infection).
- Signing of informed consent.
- Changing into a hospital gown.
- Cannula insertion in blood channel at the back of hand or arm (for injecting medication called desmopressin and fluids to manage any bleeding).
- Lie on your tummy over some pillows for biopsy of own kidney. USG machine will be used to mark the biopsy site on your back. For biopsy of a transplant kidney, lie on back and the ultrasound machine will be used to mark the biopsy site over your lower abdomen.
- Local anaesthetic will be injected to numb the skin and tissues down to the edge of kidney. It stings a little.
- Biopsy needle will be inserted, and you will be asked to hold your breath for a few seconds (not needed for a transplant biopsy). The needle is removed. The biopsy sample is taken away from biopsy needle and preserved in saline and formalin. Two samples are taken by repeating the procedure.
- Needle is removed at the end and plaster applied. The whole procedure takes about 30 minutes.

Q: What happens after the biopsy?

Post-procedure

- Lie flat for 02 hours to minimise the risk of bleeding.
- BP monitoring & urine examination for any blood.
- May go home after 02 hours if everything goes uneventful. Cannula will be removed before you leave. Take rest for the remainder of the day and next day. Do not stay alone overnight after biopsy.
- Drink plenty of fluids (2L in 24 hours)
- Pain relief medications as prescribed.
- No shower before 24 hours. No bath sooner than 48 hours.
- Take 2-5 days off work. Avoid heavy lifting or strenuous exertion for one week.

Q: What are the risks of the biopsy?

Risks and complications

- Pain
- Minor bleeding: 1 in every 30 biopsies (in urine or kidney).
- Severe bleeding: < 1 in every 100 biopsies. May need a blood transfusion. In < 1 in 200 biopsies, a further procedure called 'embolization' may be needed to stop the bleeding. Surgery or removal of the kidney for life threatening bleeding is extremely rare.
- Inadequate sample: repeat biopsy required later.
- Bowel damage: Very rare.
- Risk of death: < 1 in 3,000 biopsies.

Q: When will I get the results of the biopsy?

- After 7-10 working days. Make an appointment to see the doctor to pick up results before leaving the hospital.

Chemotherapy

Q: What is chemotherapy?

- Chemotherapy are the chemical substances used for the treatment of cancer.

Q: What are the benefits of having chemotherapy?

- **Curative** - to cure the cancer.
- **Disease control /palliative -** not to cure but to shrink the disease to improve quality of life.
- **Neo-Adjuvant** - chemotherapy given before surgery/radiotherapy to shrink the cancer.
- **Adjuvant -** chemotherapy given after surgery to reduce the risk of cancer coming back.

Q: What are the risks of chemotherapy?

- **Common: (More than 10 in every 100 people)**
    - Anaemia (reduced number of red blood cells), tiredness
    - Increased risk of infection (drop in white blood cells)
    - Bruising or bleeding
    - Feeling sick (nausea) and being sick (vomiting)
    - Hair loss
    - Sores in mouth, taste changes
    - Effect on kidneys function
- **Less common (between 1 and 10 in every 100)**
    - Allergic reactions
    - Skin pigmentation, nail changes, brown skin marking over the venous lines, redness or soreness over the radiotherapy site.
    - Changes in hearing (cisplatin)
    - Effect on lungs (interstitial pneumonitis)
    - Diarrhoea
    - Effect on liver functions
    - Extravasation of drug (Doxorubicin and Vinblastine): leakage outside of vein causing stinging, pain, redness or swelling.
    - Irritation of the bladder lining
    - Numbness or tingling in hands or feet
- **Other:**
    - Second cancer
    - Heart problems (cardiomyopathy)
    - Aggravation of increased risk of blood clot in blood channels (thrombosis)
    - Infertility due to damage to women's ovaries and men's sperm.
    - Damage to baby in the womb. Pregnancy or fathering a child contraindicated during and after chemotherapy up to 12 months.
- **Side-effects with anti-sickness medication:**
    - Constipation, headaches, indigestion, difficulty sleeping and agitation.
- **Possible side-effects of GCSF include**
    - Bone pains
    - Red/itchy skin at the site of injection
    - Fever, chills and fluid retention
    - Feel sick (nausea), be sick (vomiting) or diarrhoea.

3. Decision for emergency surgery in intubated patient under the principles of best interest

Your role:	You are the doctor on call
Problem:	Discussing further management of an unconscious patient
Patient:	Mr. Basharat Wahab, 75 years old man
Relative:	Mrs. Kaneez, the patient's daughter

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

A severely injured unconscious patients brought to A&E after an accident. He has been intubated and now require emergency surgery for removal of big clot as per decision of brain surgeon under the principle of best interest.

Your task: to explain her about her father condition and requirement of emergency surgery and her opinion in the absence of father ability to give consent.

▶ Greeting

- *"Hello! I am Dr ___________________, one of the doctors in emergency department. Are you Mrs. ______ the Daughter of Mr_________? Ok"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the condition of your father. Is that correct? Ok."*

▶ Tell

- *"Do you want me to tell about the condition of your father? …… I feel sorry that your father was brought in a critical condition due to a car accident. We have to pass a tube in his windpipe to support his breathing. His brain scan has also been done which has revealed a big clot."* ***(Golden Silence)***

▶ Help & Explain (Body of skill)

- *"Do you want me to tell more about it? ….. The clot inside his brain needs to be evacuated by opening the skull, and without removing it he can die. 100% recovery cannot be guaranteed even after clot removal. If clot cannot be removed by the operation or even after clot evacuation, brain cells damage can result causing cognitive deficit."*

Q: My father would have never agreed to an operation with a risk of neurological deficit, even knowing it could result in death without operation.

- *"I respect your feelings and concerns about your father. I can understand as you are his daughter and have lot of love for your father and understand that how much important he is for you."*
- *"But I would like to know that whether Mr. ________ has made any living will or any advanced directive with the solicitor. Has he appointed you as the lasting power of attorney to make health care decisions on his behalf?"*

Q: What if I say no? Surely, it's my right as his daughter to decide this for him when he is unable to?

- *"Legally, when the patient is unable to consent, the clinician in charge has to proceed with the treatment that is necessary to save life in the best interests of the patient. I am sorry to tell you that the Dr in charge has to do and offer the treatment to save the life in the best interest of the patient."*

- *"I can arrange your meeting with my consultant and specialist for the brain. They will be in a better position to answer your question. You can also discuss with your family as it is important to give your father a chance by carrying out surgery in his best interest."*
- *"I will also discuss with the medico-legal team, how we should proceed if this is the case."*

DON'T except the wishes of the daughter till the end.

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Referrals

▶ Recall and follow ups with contact details

4. A competent patient's refusal of treatment with warfarin

Your role:	You are the doctor in cardiology ward
Problem:	Next of kin requesting for treatment that the patient has refused to take
Patient:	Mr. Rameez Hilali, an 80 years old man
Relative:	Mrs. Ayesha, the patient's daughter

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient was admitted with atrial fibrillation (AF). Warfarin was advised but has refused to take it and decided to take aspirin. His daughter wants that his father should be started on warfarin.

Your task: to speak to Mrs. Anderson about her father's informed decision to decline anticoagulation and discuss the legal and ethical issues surrounding this.

▶ Greeting

- *"Hello! Good morning. I am Dr ____________________, one of the doctors in the heart ward. Are you Mrs._______ the Daughter of Mr. _________? Ok"*
- *"Well, I understand that your father was admitted with some heart problem and treatment was offered to him. Is that correct?"*

▶ Agenda setting

- *"Before I proceed further will you tell me what you know about your father's condition? ...... I appreciate your feelings for your father. We explained everything to him including benefits (reduction in future stroke risk), and possible risks of anticoagulation but he is not agreeing to be treated with warfarin."*

▶ Tell

Q: Why he made this decision?

- *"The main reasons are that he does not wish to have his coagulation tested every few weeks for the rest of his life and that he is frightened of having a stroke (cerebral haemorrhage) as he tends to have falls. ...... Did you get an opportunity to talk to your father on this issue? Its better you speak to him on this issue. I am willing to be present during this discussion if you and your father agree to it."*

Q: He might not really know what he is doing, given his age. I am his next of kin and know what is best for him so just tell him to take it?

- *"I appreciate your concerns but neither she, nor the doctors can put pressure on Mr. ________ to agree to the treatment because he is competent and can either accept or decline the treatment and we have to respect his wishes.*

▶ Help & Explain (Body of skill)

▶ Reassure

- *"Your father is getting effective treatment, although warfarin is the best treatment option, but aspirin is also effective in reducing the risk of stroke."*

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Referrals

- *"I can arrange your meeting with my consultant, and he will be in a better position to answer your questions."*

▶ Recall and follow ups with contact details

- Competent adults have a clear right to decline diagnostic procedures or treatment for reasons which are 'rational, irrational or for no reason'.

C. DIAGNOSIS AND MANAGEMENT ADVICE

Diagnosis explanation & Treatment options

(Diagnosis, Treatment, Side effects, Prognosis; and social issues like family, job, livelihood etc.)

- Obesity management
- Side effects of cardiac medication: amiodarone
- First seizure and parents wants to know
- RA patient to start with DMARDs
- Valvular heart disease in a young woman and surgery
- Air travel with COPD
- Polypharmacy
- Offering blood transfusion
- Hormone replacement therapy
- Lifestyle adjustment after MI
- Smoking
- Starting insulin therapy
- Celiac Disease
- IBD

5. Obesity management

Your role:	You are the doctor in endocrinology clinic
Problem:	Discussing further management and implications of bariatric surgery
Patient:	Mr. Majid Lashari, 45 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

An obese male patient having long standing weight problems with BMI of 43. He was intolerant to orlistat. He has tried exercise and dietary therapy over 20 years which are not successful. He has come to glands clinic to discuss bariatric surgery.

Your task: to assess Mr Manos's weight problem, lifestyle factors, and answer his questions about further management options.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctors in glands clinic. Are you Mr._________? Well, nice to meet you sir."*

▶ Agenda setting

- *"Well, I understand that we are here today to discuss the issue regarding your weight and what we can do further. Is that correct?"*

▶ Tell

- *"Before I proceed further, I would like to know what you expect to achieve from our today's discussion."*

▶ Help & Explain (Body of skill)

Q: I have tried everything including diet and exercise but it's not successful. How should I proceed further now?

- *"I am going to ask a little bit more details about your past medical history regarding your weight .... How long you are suffering from it? What steps you have taken to reduce it? What about your diet? What about exercise? What about your lifestyle? Do you smoke or drink? Any comorbid illnesses? (Like T2DM, hypertension, cardiovascular disease, dyslipidaemia, osteoarthritis, and sleep apnoea). How your obesity has affected your life & relationship?"* ***(Take a brief targeted history including family history of overweight, obesity and comorbidities)***
- *"Well, obesity management is done by multidisciplinary team which include diet specialist, physical trainers and doctors (including psychologist). First you have to follow a dietary and exercise programme advised by this joint team. Although it was not possible in the past to reduce weight by these manoeuvres, but there are good chances that you will reduce it now by the joint team efforts."*

Q: No, it's not working for me. Tell me about obesity surgery.

- *"I appreciate your concerns but speaking to dietician again may benefit you as weight cannot be reduced without dieting, exercise and adopting healthy lifestyle. Even if you want to go for surgery (bariatric surgery) you will need to follow specific dietary guidelines to ensure that the desired weight loss is achieved and to prevent the side effects of surgery (dumping syndrome)."*

Q: No, I am tired of all these fruitless efforts. Now refer me for weight loss surgery.

- *"I appreciate your concerns, but it is very unlikely that surgeons will operate on you without knowing that optimised dietary and lifestyle factors have failed to achieve weight reduction."*
- *"Surgical procedures are also not without risks especially in obese patients (risk of anaesthesia, postoperative complications)."*

Q: Do I require some tests today?

- *"Your BP will be checked; waist and hip circumference will be measured. I will also ask you to have some blood tests before you leave the clinic today to look for secondary obesity (HbA1c, BSF ± OGTT, fasting insulin, blood fat levels, LFTs, TFTs, and other endocrine functions tests)."*

▶ Reassure

- *"You will be followed up in the clinic for monitoring the progress regularly. In the meantime, I will also discuss with my consultant about your request for referral to surgery. The outcome will be discussed with you at your next visit to clinic."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?*

▶ Recall

- *"Take your time to think over it to make a decision. I can call you later in the clinic to know about your decision."*

Obesity: NICE guidelines (Adults)

Classification of overweight and obesity

Classification	BMI (kg/m²)
Healthy weight:	18.5–24.9
Overweight:	25–29.9
Obesity I:	30–34.9
Obesity II:	35–39.9
Obesity III:	≥ 40

- For muscular adults BMI interpretation is less accurate for adiposity
- For South Asian and Chinese, use lower thresholds for BMIs due to high risk of T2DM and cardiovascular diseases at BMI lower than 25 kg/m² (23 kg/m² for increased risk and 27.5 kg/m² for high risk).

Assessment of health risks based on BMI and waist circumference

BMI classification	Waist circumference		
	Low	High	Very high
Overweight	No Increased risk	Increased risk	High risk
Obesity I	Increased risk	High risk	Very high risk

Men: waist circumference of < 94 cm is low; 94-102 cm is high and > 102 cm is very high.
Women: waist circumference of < 80 cm is low; 80-88 cm is high and > 88 cm is very high

Intervention based on BMI, waist circumference and comorbidities

BMI Classification	Waist circumference			Comorbidities present
	Low	High	Very high	
Overweight	1	2	2	3
Obesity I	2	2	2	3
Obesity II	3	3	3	4
Obesity III	4	4	4	4

Score	Advice
1	General advice on healthy weight and lifestyle
2	Diet and physical activity
3	Diet and physical activity; consider drugs
4	Diet and physical activity; consider drugs; consider surgery

Referral to tier 3 services if:

- Inadequate management in tier 2 due to complex disease
- Assessment required for cause of obesity / overweight
- Unsuccessful conventional treatment
- Consideration of drug treatment for a person with a BMI > 50 kg/m^2
- Consideration for surgery
- Specialist interventions required for very-low-calorie diet

Lifestyle interventions

- Increase physical activity levels
- Healthy eating with reduce energy intake

Behavioural interventions

- Self-monitoring & goal setting
- Stimulus control
- Slowing rate of eating

Dietary modification

- Tailor dietary changes to food preferences and allow flexible approach instead of unduly restrictive and nutritionally unbalanced diet.
- Diets having 600 kcal/day deficit than the person's needs are recommended for sustainable weight loss.
- Consider low-calorie diets (800-1600 kcal/day) but be aware these are less likely to be nutritionally complete.
- Only use very-low-calorie diets (< 800 kcal/day) if rapid weight reduction is required clinically (requirement of joint replacement surgery or seeking fertility treatment). Ensure nutritionally complete diet not exceeding 12 weeks with ongoing clinical support.
- Encourage to eat a balanced healthy diet in the long term.

Physical activity

- Reduce spending inactive time spent (watching TV, using computer or playing video games)
- Encourage at least 30 minutes of moderate or greater intensity physical activity on 5 or more days a week in 1 or several sessions lasting 10 minutes or more. Beneficial even if no weight reduction (reduced risk of T2DM and cardiovascular disease).
- For obesity prevention: 45-60 minutes of moderate intensity activity a day
- For avoiding weight regain after weight loss in obese: 60–90 minutes of activity a day

Recommended physical activity types:

- Brisk walking, cycling, gardening
- Swimming, stair climbing, aiming to walk a certain number of steps each day
- Supervised exercise programmes

Pharmacological interventions

- Consider drug treatment if target not achieved or reached a plateau on dietary, activity and behavioural changes.
- Discuss the benefits, adverse effects and monitoring requirements.
- Consider vitamins and minerals supplement if there is concern about micronutrient intake adequacy.
- **Orlistat:** Prescribe only if one of the following criteria met:
  - BMI of 28 kg/m2 or more with associated risk factors
  - BMI of 30 kg/m2 or more.

  Continue orlistat beyond 3 months only if lost at least 5% of initial body weight since starting drug treatment. Decide longer than 12 months use for weight maintenance after discussing potential benefits and limitations with the person.

- **Liraglutide (Saxenda)**: is a treatment option for whom lifestyle and behavioural approaches have not been effective and for whom the potential benefits of treatment outweigh the risks. Use in adults with obesity, up to a maximum dose of 3.0 mg per day.

Bariatric surgery (Obesity surgery)

- Gastric banding, gastric bypass, sleeve gastrectomy and duodenal switch. Usually done laparoscopically.
- Resolution of type 2 diabetes may be an additional outcome. (60% achieve remission after Roux-en-Y gastric bypass surgery)
- Provide clear post-operative dietary advice due to risk of significant metabolic changes (vitamin B12 and iron deficiency).

Bariatric surgery if following criteria are met:

- BMI of > 40 kg/m2, or 35 - 40 kg/m2 with other significant disease (T2DM or high BP).
- Failure of all non-surgical measures in achieving or maintaining adequate clinically beneficial weight loss.
- Intensive management in a tier 3 service
- Fit for anaesthesia and surgery.
- Person commits for long-term follow-up.

Consider for bariatric surgery if:

- BMI of 30 - 34.9 with recent-onset T2DM with assessment in a tier 3 service.
- Asian family origin at a lower BMI than other populations with recent-onset T2DM with assessment in a tier 3 service

Specialist and/or bariatric surgeon should discuss the following:

- Potential benefits
- Long term implications of surgery
- Associated risks
- Complications
- Perioperative mortality

6. Side effects of cardiac medication: amiodarone

Your role:	You are the doctor in cardiology clinic
Problem:	Discussing the possibility of iatrogenic illness with a patient
Patient:	Mr. Ahmad Kashmiri, 70 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A patient having chronic atrial fibrillation with repeated unsuccessful cardioversion has been started on amiodarone to which he developed cough and shortness of breath due to lung fibrosis. CT Scan has been done which showed patchy ground glass appearance with reticulonodular opacities. He visited the clinic to find out the result of his CT scan.

Your task: to explain the result of his CT Scan and the reason for his cough and shortness of breath being lung fibrosis related to his cardiac treatment amiodarone. Outline also your proposal to manage his lung fibrosis.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctors in heart clinic. Are you Mr. ________? Well, nice to meet you sir."*
- *"Well, I understand that you were having heart problems and you were put on some medication 'amiodarone'. Then you developed cough and breathing problem and scan of your lung was done. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the possible cause of your cough and breathing problem; and what we can do further. Is that Ok? Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

- *"Have you been told anything prior to CT scan of your chest? ...... So, what do you think what the cause of your breathing problem could be?"* ***(Ask understanding about problem)***
- *"Well, I have results of scans of chest with me and it is showing that you are have scaring of lungs which in medical field is called lung fibrosis."*
- *"I would like to ask you few personal questions. Do you smoke? What do you work as a?"* ***(Take a brief personal & occupational history)***
- *"As you don't have any other risk factors suggestive of any other cause of your symptoms, there is a possibility that your breathing problem could be due to the medication 'amiodarone' you are taking."* ***(Golden silence)***

▶ Help & Explain (Body of skill)

Q: Why no-one told me that this drug could destroy my lungs? Why such a nasty drug was started in first instance and why was it not stopped before it could cause any permanent damage?

- *"I apologize that you were not made aware of the side effects of amiodarone, but the heart specialist felt that this was the best treatment for your heart problem because you were not responding to other treatments."*

Q: Would I end up on lifelong oxygen like my brother who had 'severe emphysema?

- *"Lung complications are uncommon side effects of amiodarone, and it is reversible in ~75% of people on stopping the medication. It is extremely unlikely that you will deteriorate or end up on long-term oxygen. The improvement may not be apparent immediately after stopping the drug as it stays in blood for longer duration. I will discuss further plan with my consultant, but you will most likely require to stop amiodarone."*
- *"Are you having any other side effects of amiodarone like yellow discoloration of whites of eyes, heat intolerance, corneal deposits, and numbness or tingling in hands or feet."*
- *"I will also refer you to the local chest consultant urgently. There is a possibility that he may start you on a course of steroids to decrease the inflammation in the lungs and patients respond well to it."*

Q: Does stopping this medication means that I am going to become sicker than I am at the moment?

- *"I will closely watch the cardiac side of things and will start you on different medication if needed to ensure that your atrial fibrillation is optimally controlled."*

Q: I want to complain about the cardiology consultant?

- *"I appreciate your concerns and I will give you appropriate information how to do it later because currently I am more concerned about the condition of your lungs and breathing problem."*

Q: Explain me where to go for a complaint later?

- *I you wish to take matter further then you can contact the Patient Advice and Liaison Service (PALS) or Independent Complaints Advocacy Service (ICAS)."*

▶ Referrals

- *"I will book your appointment with the chest consultant urgently."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far". **(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Recall and follow ups with contact details

Commonly asked mmedications in scenarios

Amiodarone, warfarin, statins, digoxin, antibiotics

Amiodarone side effects:

- Photosensitivity
- Slate-grey pigmentation of skin
- Thyroid abnormalities
- Deranged LFTs
- Corneal deposits
- Pulmonary toxicity: in 5–10% of patients. Risk factors include old age, daily dose >400mg, treatment duration >2 months and pre-existing lung disease.

Warfarin anticoagulation reversal (British National Formulary guidelines)

- **INR > 8.0 + minor bleeding**
  - Stop warfarin
  - Vitamin K_1 slow IV 0.5 - 1 mg (5 - 10 mg for complete reversal) repeat dose if INR still too high after 24 hours
  - Restart warfarin when INR <5.0
- **INR > 8.0 + no bleeding**
  - Stop warfarin
  - Vitamin K_1 by mouth using IV preparation 2.5-5 mg (repeat dose if INR still too high after 24 hours)
  - Restart warfarin when INR <5.0

- **INR 5.0-8.0 + minor bleeding**
  - Stop warfarin
  - Vitamin K_1 by mouth using IV preparation 1 - 2.5 mg
  - Restart warfarin when INR <5.0
- **INR 5.0-8.0 + no bleeding**
  - Withhold 1 or 2 doses of warfarin
  - Reduce subsequent maintenance dose
- **Unexpected bleeding at therapeutic levels** - always investigate possibility of underlying cause e.g. unsuspected renal or gastro-intestinal tract pathology.

Digoxin side effects

- Ocular symptoms include blurred vision, scintillating scotomas, and xanthopsia (yellowing of vision). Visual symptoms are caused by direct toxicity to photoreceptors and are reversible with discontinuation of the drug.

Complaint launching

- Do not involve directly
- **Local dealing at hospital and GP surgery:** Try to convince
- **Legal action:** solicitor involvement. Validity of the case will be explored.
- **Patient Advice and Liaison Service (PALS)**
- **Independent Complaints Advocacy Service (ICAS)**

7. First seizure and parents wants to know

Your role:	You are the doctor in the medical ward
Problem:	Dealing with first seizure
Patient:	Miss Zaib-un-Nisa, 20-year-old student

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A female with first seizure was brought to the emergency department by her parents yesterday. She was given diazepam to control her seizure. CT Scan brain is normal. She is feeling better the next morning and wants to go home. Parents want to know about her.

Your task: to explain the diagnosis and management of seizure to the patient and take consent up to what extent the parents are to be informed.

▶ Greeting

- *"Hello! Good morning. I am Dr ____________________, one of the doctor in medical ward. Are you Miss __________? Well, nice to meet you madam."*
- *"Well, I understand that you were having some visual problems with visual blurring and you were admitted, and scan of your brain was done. Is that correct?"*

▶ Agenda setting

- *'Well, I am here to discuss with you about your medical condition and what we can do further for you. Is that Ok? So for this it is preferable that I see you in the private first before bringing your parents in, because I may ask you some important questions or some sensitive issues like drugs, alcohol which you may not want your parents to know about……. ok." **(Ask about privacy)***
- *"Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

- *"Did anybody mention with you about the possible cause of your problem?"*
- *"So what do you think what could be the cause?"*

Q: What happened to me?

- *"Well, the recent activity was seizure. Doctors are quite confident about the diagnosis based on the history given by your parents and the paramedic crew who brought you to the hospital." **(Golden silence)***
- *"Do you know about seizure or you want me to tell about this? ….. Seizure is a condition with disorganised electrical activity in the brain."*

▶ Help & Explain (Body of skill)

Q: Does it means that I have epilepsy?

- *"This is a good news that single seizure activity does equate with the diagnosis of epilepsy and presence of recurrent seizures activity is required to meet the diagnosis."*
- *"I am going to ask you a little bit about your past medical history. Do you have any febrile convulsions in childhood, any head trauma or other significant medical history? Are you taking any prescription or over-the counter medications? Do you drink or take any illicit drug? Any stress related issues in the life?" **(Take a brief history)***

Q: Do I require some other tests?

- *"I would like to arrange outpatient appointment for another test called EEG to look electrical activity of your brain."*

Q: What can you do to stop it?

- *"I appreciate your concerns, but this is not usual practice to start with treatment following a single fit because chances of recurrence are indeterminate especially if there are no risk factors. There are also side effects of different anti-epileptic treatments; as you are young and you may plan for baby, it can adversely affect your baby. However, if you have another fit, or believed to be at high risk of recurrent seizures as deemed by the specialist, there is a chance you may need to be commenced on treatment."*

Q: Would I be able to drive?

- *"I am sorry to tell you that there are driving restriction after first unprovoked fit for 06 months as other people could be at risk if you have a seizure while driving. You need to inform the DVLA. If you will not pursue, then we will involve your relatives for this. Even then if you continue to drive, then we will be bound to inform the DVLA, but we will tell you before informing the DVLA. You also need to tell your insurance company about the seizure as your insurance policies has become invalid after the fit."*

Q: Will it happen again?

- *"The risk of recurrence in the 2 years after a first unprovoked seizure is 15-70%. Factors that increase the risk of recurrence are an abnormal MRI brain scan, an abnormal EEG, and a partial-onset seizure. So, you should avoid risk taking behaviours like going to gym and doing swimming, locking the door while going to the toilet.'*

▶ Referrals

- *"I will book your appointment with the brain specialist for follow up in the clinic."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

Note:

- Such scenario may also be asked in another way in which you will be asked to speak to the patient's parents about the event. Give them an overview of what happened and reassure them. Be aware to maintain patient's confidentiality by not disclosing any personal matters to which the patient has specifically requested not be mentioned to parents.
- Other favourite exam scenarios regarding driving are diabetic patient on insulin (with or without hypoglycaemic attacks); after MI, stroke or surgery; obstructive sleep apnoea; and collapse with unknown cause.

Driving restrictions (UK DVLA guidelines)

Disease	Private vehicle licence	HGV / PSV license
Fits		
First unprovoked seizure while awake **(with a low recurrence rate < 2%/year)**	**6 months** (fit free/ after medical review) **6 months** during treatment changes	**5 years** (Fit free/after medical review)
Epilepsy with seizures while awake **(2 or more seizures)**	**1 year** (fit free/after medical review)	**10 years** (fit free off medication & risk of recurrence < 2%/year)
Seizures while asleep and awake	**3 years**	
Seizures while asleep	**1 year**	
Seizures not affecting consciousness or driving	**1 year**	
ACS	**1 month** if untreated **1 week** if treated with stent and normal LV	**6 weeks** if symptom free and no inducible ischaemia on ETT
Stroke/TIA	**1 month** if no persistent deficit	**1 year** if no persistent deficit
IDDM	**Notify DVLA** may drive if no visual impairment and aware of hypoglycaemia	**Banned**
OSA		
Suspected: having excessive sleepiness & adverse effect on driving	Stop driving but do not notify DVLA until diagnosis confirmed.	
Diagnosed: without excessive sleepiness or adverse effect on driving	No need to notify DVLA and continue to drive as normal.	
Diagnosed: having excessive sleepiness or adverse effect on driving	Stop driving and must notify the DVLA in writing rather than by email or phone. The treatment for OSA is very effective if used correctly. So by the time the DVLA paperwork is to be completed, the driver has already been treated with resolution of symptoms. In this case, the DVLA should not revoke license.	

- A series of fits in 24 hours constitutes one episode.
- Informing the patient about driving restrictions is the physician's responsibility while informing the DVLA is the legal responsibility of license holder by filling out 'Declaration of Surrender for Medical Reasons' form. DVLA can reissue the licence following the stipulated period if cleared from patient's medical practitioner. If patient is still driving, the physician should once again remind the patient that he/she should not be doing so and that he/she is legally bound to inform the DVLA. This should be clearly documented in the notes. If physician finds out that the patient is continuing to drive despite repeated warnings, inform the medical adviser at the DVLA but patient should be told first that DVLA is being informed.
- Physicians should also let the patient know that their insurance is invalid until the change in their medical status has been reported by them and is on their motor insurance record.

8. RA patient to start with DMARDs

Your role:	You are the doctor in rheumatology clinic
Problem:	Initiating DMARDs in Rheumatoid arthritis
Patient:	Miss Alizai Chaudhary, 25 years old chef in a top Islamabad restaurant

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A young female was diagnosed with RA 3 months ago. She was not keen to be started on medication at the time of diagnosis and was prescribed NSAIDs and paracetamol. She has not responded to it. Consultant feels that she should be started on steroids and DMARDs.

Your task: to discuss the management options and address concerns.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the joint clinic. Are you Miss _________? Well, nice to meet you madam."*
- *"Well, I understand that you are having some joint problems and you have been using some medications for it. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your joint problem and what treatment options we can offer you. Is that ok? Before I proceed further, will you tell me that how you are feeling now? (Do you have pain or swelling in any other new joint? Any improvement with pain relieving medications?)"*

▶ Tell

Q: What can you do for my joints problem?

- *"There are different modalities of treatment available for your joint problem. In one type medications are not given like advising the patients some exercise to increase the strength of muscles, providing the patient some supports for their deformed joints and some relaxation techniques. Are you aware of any of those?"* ***(Ask understanding about management)***
- *"Had my consultant discussed with you last time about the treatment for your rheumatoid arthritis? ..... We (me and my consultant) are thinking to give you some steroids to decrease the inflammation of your joints to prevent spread of the arthritis and destruction of your joints."*

▶ Help & Explain (Body of skill)

Q: There is no way I am going on steroid tablets as I have read it causes weight gain. Can you give me any other medication for the arthritis?

- *"Steroid will be used hopefully for a short duration in your case while you are being established on more long-term medication, and also to treat the acute flare-ups. There are fewer side effects (like weight gain, hyperglycaemia, thinning/bruising of the skin) if you are on a low dose of steroids for a short duration and these side effects are also reversible. You will be also be monitored closely in the clinic for side-effects of steroids and any other medication you are started on. Your wishes will be appreciated and as you will say we will do instead of forcing you to go onto any medication that you are not keen on."*
- *"Other treatments are also available which will stop the progression of your disease and involvement of other joints. For this, I can discuss with my consultant about starting one of these medications. I can also arrange your meeting with my consultant. I need to know before it that, are you married or planning for*

pregnancy as one of these medications (methotrexate) is absolutely contraindicated during pregnancy as we need to be more careful in women of child-bearing age."

Q: Do I have to tell my work about this diagnosis?

- *"You are not required by statutory law to tell your employer about your diagnosis. This is not an infectious disease and we will also maintain your confidentiality. You can continue with your job without restriction if RA is reasonably well controlled especially with medication."*

Q: I am worried about my job. Would my bosses dismiss me from work if they think the arthritis in my hands will affect my ability to prepare food?

- *"If you face any difficulty in performing the job, you should speak to the occupational health department in your workplace. Agencies such as the National Rheumatoid Arthritis Society (NRAS) can also be a good source of support for patients with RA."*

▶ Referrals

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far".* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"I will discuss with my consultant about starting you on disease-modifying treatment for the RA, if you agree, I will be in touch with you soon. Please take the contact details of the rheumatology specialist nurse who may be able to help you further."*

9. Valvular heart disease in a young woman and surgery

Your role:	You are the doctor in cardiology clinic
Problem:	Discussing the further management and implications of treatment for mitral valve disease
Patient:	Miss Javairia Talha, a 28-year-old woman

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A young female with breathlessness and palpitations was found to have AF. Echocardiography revealed severe mitral stenosis. Cardiac catheterization studies confirmed valve area 1.4 cm^2 and pulmonary artery pressure 45 mmHg. Heart consultant and cardiothoracic surgeon agreed that mitral valve surgery is the best treatment for her. You are seeing her in the clinic to discuss this need for valve surgery.

Your task: to explain to the patient why she needs a valve replacement. The patient may want to know if there are any other treatment options available. As she is about to get married, she is worried about the effects of the valve replacement and treatment on future pregnancies and the implications for the fetus.

▶ Greeting

- *"Hello! Good morning. I am Dr ________________, one of the doctor in the heart clinic. Are you Miss _________? Well, nice to meet you madam."*
- *"Well, I understand that you were having some heart problem and some tests were done for you regarding that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the possible diagnosis and what we can do further for you. Is that Ok? Before I proceed further, will you tell me how you are feeling now?"*

▶ Tell

- *"Well, I Have the results of your heart scan and catheter test with me and it is showing that one of your valves of your heart has narrowed and it's not functioning well. This condition is called mitral stenosis. This is most commonly caused by rheumatic heart disease, but in your case, it is likely to be a congenital abnormality as you do not appear to have had rheumatic fever in the past."*
- *"Your hospital admission for irregular heart rhythm (AF) was 'due to strain put on the heart' by your narrowed heart valve (mitral stenosis) which often manifests initially during exercise in young people."*

▶ Help & Explain (Body of skill)

- *"Have you spoken to any doctors or heard about any treatment options for this condition. Do you want me to tell you about it?"*

Q: Do I really need to have the surgery on my heart - I feel quite well in myself now!

- *"My cardiology consultant has discussed your case with the cardiothoracic surgeons, and they feel that heart valve surgery is best possible treatment for you, most likely a replacement, as the condition is likely to be progressive and can result in more complications. It is often asymptomatic in the early stages but, as the disease progresses, it can present with complications such as atrial fibrillation, pulmonary hypertension and left or right ventricular failure (initially on exertion)."*

Q: Is there any alternative to surgery?

- *"Yes, there are other alternative in which repair of damaged heart is done like percutaneous mitral balloon valvuloplasty, valvotomy, commissurotomy. The heart surgeon will be able to advise which treatment is better option for you."*

Q: What are the different types of heart valve replacements and their advantages and disadvantages?

- *"There are metallic valves and tissue valves. Metallic valve are more durable but require lifelong anticoagulation. These valves are preferred if patient is less than 65 years of age. The tissue valves are less durable and don't require anticoagulation. The tissue valves are therefore preferred if patient is more than 65 years to minimize the chance of bleeding."*

Q: Will a new valve mean that I will have to take blood-thinning tablets for the rest of my life?

- *"If a metallic valve is inserted inside your heart, you need to take blood thinning medication (warfarin) for life following the procedure. The other types of valves (i.e. tissue bioprosthetic) in which you do not require blood thinning medications would not be recommended in your case due to shorter lifespan (10–15 years)."*

Q: I am about to get married. Will having an operation stop me being able to have a family?

- *"During early pregnancy warfarin can affect your baby (spontaneous abortion; developmental malformations of bone and cartilage, placental and maternal bleeding) and we need to change your medication prior to pregnancy until delivery to injectable form which is heparin, and warfarin is stopped. You will be closely monitored by heart specialist, blood specialist and gynaecologist specialist when you will become pregnant. You will be asked to withhold LMWH for 24 h before delivery to reduce the chances of perinatal bleeding. You can be restarted on warfarin after the delivery, with a few days of cross-cover with LMWH. Both warfarin and LMWH are safe in breastfeeding."*

Q: Can I postpone the surgery until after I have a baby?

- *"If you postpone surgery, there is risks of progression of the mitral stenosis and cardiac complications due to the physiological changes in pregnancy. I can arrange your meeting with heart specialist and gynae specialist, and they will be in better position to tell you that which is more severe, and which we can postpone, your heart surgery or your baby."*

▶ Referrals/Leaflets

- *"I will arrange your appointment with the cardiothoracic surgeon and gynae specialist shortly, where you can ask more about the different surgical procedures and anticoagulation in pregnancy."*

▶ Reassure

- *"Your consent and your wishes will be appreciated and as you will say we will do.... Take time to think."*

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

Mitral stenosis

Severity of Mitral Stenosis:

(Normal mitral valve area 4 - 6 cm^2)

Severity of mitral stenosis	Severity Valve area (cm^2)	Gradient (mmHg)
Mild	1.6 - 2.0	< 5
Moderate	1.0 - 1.5	5 - 10
Severe	< 1.0	> 10

Causes:

- **Rheumatic:** commonest cause.
- **Congenital**

Management

- MEDICAL:
    - ***AF:*** Rate control (with beta-blockers, digoxin, amiodarone) and oral anticoagulation
    - ***Diuretics***
- **PERCUTANEOUS BALLOON MITRAL VALVULOPLASTY (PBMV):** (treatment of choice in MS)

  Indications:
    - Pure MS
    - Minimal regurgitation
    - Pliable, non-calcified valve
    - No left atrial thrombus

  Contraindications:
    - Moderate to severe MR
    - Heavily calcified mitral valve
    - Left atrial thrombus
    - Concomitant CAD or other valve disease requiring surgery
- **SURGERY:** closed mitral valvotomy (without opening the heart) or open valvotomy (requiring cardiopulmonary bypass) or mitral valve replacement

  Indications: *failure to respond to medical therapy of following condition*
    - Progressive dyspnoea
    - Pulmonary oedema
    - Major haemoptysis

Treatment of MS in pregnancy

- Bed rest
- Anaemia correction
- Severe symptomatic tight MS: Mitral valvotomy may be done usually in middle trimester
- Complete full term with caesarean section
- Advise to restrict number of pregnancy (1 to 2)

Prognosis

- Asymptomatic latent phase 15 - 20 years
- Symptomatic NYHA class > II: mortality 50% at 5 years

10. Air travel with COPD

Your role: You are the doctor in respiratory clinic

Problem: Discussing fitness for air travel in COPD patient

Patient: Mr Burhan Ahmad, 65 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This COPD patient has relatively well controlled symptoms with three different inhalers. He very rarely uses nebulizer machine and is not on home oxygen. He is slightly breathless when walking a mile or two on level ground. His saturation levels on air are 94% and his most recent spirometry shows a FEV_1/FVC ratio of 60% and a FEV1 of 65% predicted. Apart from few days of admission 2 months ago due to infective exacerbation of his COPD due to bad weather, there is no history of exacerbation over the last one year. He is coming to see you in clinic because he wants to go on long air flight.

Your task: to assess the severity of his COPD and advise him on whether it is safe for him to fly or if any further assessments need to be done.

▶ Greeting

- *"Hello! Good morning. I am Dr ________________, one of the doctor in the chest clinic. Are you Mr. _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having 'smoker's lung disease' (COPD) and you are on some treatment for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to assess the severity of your disease and to know your fitness whether it's safe for you to fly or not. Is that Ok? Before I proceed further, will you tell me how you are feeling now after your discharge from hospital? (What was the possible cause of this exacerbation? Are you back to your baseline level of functioning?)*

▶ Tell

Q: Look, I have to go on this holiday. I have been saving for the last few years for this!

- *"In view of your lung disease and recent hospital admission with an exacerbation, you will need further assessments before being given the reassurance you are looking for."*

▶ Help & Explain (Body of skill)

- *"I would like to ask little bit detail to assess your current quality of life. Is that ok. Do you have breathlessness on walking or even at rest? How much distance can you walk on flat at normal pace before stopping ...? And before the illness? How many flight of stairs can you walk up before stopping ...? And before the illness? Are you short of breath while doing activity of daily living?"* ***(Exercise capacity)***
- *"How many medications or inhalers are you taking at home for your disease? Are you taking them regularly? How often do you require nebulizer machine at home?"* ***(Medications)***
- *"Are you on home oxygen therapy?"* ***(LTOT)***
- *"Have you quit smoking?"*
- *"I would like to ask little bit about your past medical history. How many times you have been admitted to the hospital due to this lung's problem? Do you have any other diseases that may be an issue while flying,*

like previous blood clots in blood channels of lungs, pneumothorax, scaring of lungs, heart failure or coronary heart disease?"

- *"Well, before flying, you need further tests to ascertain your fitness to fly like measurement of your oxygen saturation in the blood with oxygen (that will simulate being on a flight at 30,000 feet) and without oxygen.*
- *It's safe that certain measures you need to take with you while flying like carry all your inhalers in your hand luggage. You can ask for inflight nebulizer if needed. You can also ask for a wheelchair to assist you to and from the aircraft due to your limited exercise tolerance. Be mobile during flight, keep on walking and don't keep on sitting for a long time during the flight. Do take the travel insurance policy with you as if you become sick then your insurance policy is there, and you are covered medically anywhere where you are."*

Q: Can you arrange for me to have some oxygen on the flight?

- *"It's wise that you should inform your airline company about your diagnosis and disease whilst further assessments are pending, so they knew that you will come."*

▶ Referrals

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"I will be in touch with you soon to discuss the results of the respiratory physiology tests."*

Air Travel recommendations in COPD (British Thoracic Society)

- PaO_2 at a cabin altitude of 8000 feet is equivalent to 15.1% at sea level falling to 7 - 8.5 kPa resulting in problem for those with COPD, asthma and pulmonary fibrosis. (O_2 concentration remains same as at sea level)
- Patients with chronic lung disease should inform their airline in advance, of their condition and their likely requirement for inhalers, nebulizers or oxygen during the flight. A doctor's letter will need to be provided to the airline company.
- If planning a long-haul flight and using a CPAP machine to treat the sleep disorder, obstructive sleep apnoea (OSA), think if you might need to use your machine during the flight. Some airlines have restrictions on what machines are permitted for use on board. Others may require you to fill in a form before you travel.
- In-flight oxygen is usually given at a rate of 2 L/min via nasal cannulae and usually commenced when the plane is at cruising altitude (flow rate will be increased for those who are on supplementary oxygen at ground level).
- Patient with recent pneumothorax or venous thromboembolism should not be flying unless seen by a consultant respiratory physician. Patient with open tuberculosis are advised not to fly.

Recommendations

- Measure resting oxygen saturation in the blood on room air. If
  - **PaO_2 <92% or on LTOT:** in-flight O_2 should be advised.
  - **PaO_2 92 - 95% with risk factors** (FEV1 <50%, hypercapnia, coexisting restrictive lung disease, discharge from hospital within last 6 weeks for exacerbation of chronic lung or heart disease)**:** Give hypoxic challenge test with 15% FiO2 for 20 min and check oxygen saturation in the blood (arterial), if
    - PaO_2 < 92% (6.6 kPa): in-flight O_2 should be advised.
    - PaO_2 >95% or >92% without risk factors: O_2 requirement very unlikely

Air travel recommendations in Diabetes

- Contact airline in advance about special meal options if there is a dietary restriction.

What to pack

- Pack medications with extra supplies in a separate clear, sealable bag (insulin, syringes, lancets, test strips, glucagon emergency kit, urine or blood ketone strips if T1DM): 50% additional insulin supply and double number of glucose strips @ four tests per day for the duration of trip. Regular insulin or short-acting insulin analogues for treating high blood glucose and for sick-day management even if these are not part of regular regimen. Keep in original box, which displays label and pharmacy instructions. Lancets must be capped and accompanied with a glucose meter. If using pump, keep insulin pens, long-acting insulin and Novo Rapid for switching to conventional regimen to be used in case of pump failure.

- Keep a quick-acting source of glucose to treat low blood sugar as well as an easy-to-carry snack such as a nutrition bar.
- Carry or wear diabetes identification card, Medic Alert necklace or bracelet + contact information for physician. Written prescriptions and letters from health care providers may be helpful but may not be accepted as adequate proof because of forgery concerns.
- Insurance papers for medical coverage in the event of a medical problem abroad.

Before boarding:

- Keep insulin in hand luggage during flight to avoid damage, exposure to extreme temperatures. Insulin is stable under normal conditions out of the fridge if not exposed to high temperatures or direct sunlight.
- X-ray machines have no effect on blood glucose monitoring devices and insulin pumps. If any concern, request for hand-check of carry-on bags.

On board ("eastward = less insulin; westward = more insulin")

- Patients should be advised to leave their wristwatches unadjusted during flight so that they continue to correspond to the time at their point of embarkation. This will make it easier for patients to judge the timing of their insulin injections and meals.
- Adjust insulin injections and mealtimes while crossing time zones for long-haul flights. When traveling north or south, no adjustments in the 24-hour schedule are needed. Adjustments are unnecessary if crossing fewer than five time zones (in short-haul flights 1-2 hour's difference).
- Patients who are not insulin pump users should be switched to a "basal- bolus" insulin regimen before traveling, because short of pump therapy, this is the ideal system to cope with all time zone travel situations. Traveling across time zones is easy with a pump as no need to change anything if taking basal rate profile.
- ***Traveling east:*** will shorten day or night and may necessitate a reduction in insulin.
    - Option 1 – reduce the dose. Keep the watch on hometown time on the plane, and takes Lantus according to hometown time. On arrival switch to destination time, take Lantus in reduced dose next day.
    - Option 2 – change over two days. On arrival day, takes Lantus according to previous hometown time and next day take Lantus according to destination time. The difference of time will be divided in two days, so there will be no need to plan reduced insulin doses. If risk of overnight hypoglycaemia, reduce the Lantus doses by around 10%.
- ***Traveling westward:*** will lengthen day or night and may necessitate increased insulin.
    - Option 1 – "Fill the gap" of extra hours of long acting insulin with an extra dose of Novo Rapid. Calculate and add extra dose to premeal Novo Rapid.
    - Option 2 – change over two days. On arrival day, takes Lantus according to previous hometown time and next day take Lantus according to destination time. The difference of time will be divided in two days, so there will be no need to plan extra insulin doses. Blood glucose levels can be little higher before bed which can be managed by taking a little extra Novo Rapid if necessary.

Advice for those on oral agents for diabetes

- The timing of oral medications for diabetes is not as crucial as that of insulin. It might be easier to skip a dose and have slight hyperglycaemia for 6–8 hours rather than to take two doses too close together and risk becoming hypoglycaemia.

Note:

- ***Long trekking trips:*** Leave a cache of insulin safely in a fridge somewhere for using if the insulin you had with you stopped working earlier than expected.
- In-use insulin can be kept at room temperature (11-25°C) for up to 4 weeks, and insulin that isn't in use should be in a fridge (2-8°C).
- Use ice packs for traveling from place to place in a hot climate but take care it should not go frozen. *Frio wallets* can help to keep insulin at 18-26°C.
- **Adjust insulin doses:** May need more insulin if eating more. In hotter weather, people often eat less and need less insulin. Lazy holidays may need more insulin while active may need less insulin.
- **Illness:** If develop travellers' diarrhoea, test blood sugar every two hours if levels are high, and at least four times per day if they aren't high. Take extra insulin every two hours if readings are high.

Prevention of venous thromboembolism (VTE) in air travel

(> 8 hrs or multiple shorter flights over a short period)

There is no evidence to support aspirin prophylaxis.

Low VTE risk:

Risk factors:

- All patients not in categories of moderate or low risk VTE

Advice:

- Avoid excess alcohol and caffeine-containing drinks
- Remain mobile and exercise during the flight.

Moderate VTE Risk

Risk factors:

- Family history
- Past history of VTE with identifiable cause
- Thrombophilia
- Immobility
- Obesity (BMI >30kg/m^2)
- Pregnancy, OCP, postnatal (within 2 weeks of delivery)
- Pulmonary arteriovenous malformations (PAVM)
- Significant medical illness in previous 6 weeks
- Cardiac disease

Advice:

- Occupy an aisle seat with greater leg room
- Wear below-knee compression stockings
- Avoid sedatives and sleeping for prolonged periods in abnormal positions

High VTE risk

Risk factors:

- Past history of idiopathic VTE
- PAVM with a history of previous VTE or embolic stroke
- Within six weeks of major surgery or trauma
- Active malignancy

Advice:

- Occupy an aisle seat with greater leg room
- Wear below-knee compression stockings
- Avoid sedatives
- Avoid sleeping for prolonged periods in abnormal positions
- Consider a pre-flight prophylactic dose of LMWH or formal anticoagulation (INR 2–3)

Patients with VTE

- Should not fly for 4 weeks or until the resolution of proximal DVT /symptoms.

(Other scenarios: Patient flying with muscular dystrophy)

11. Polypharmacy

Your role:	You are the doctor in a diabetic clinic
Problem:	Explaining the importance of treatment for addition of medicine to a patient who is already on polypharmacy
Patient:	Mr Hamid Latif, 65 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

The patient has 15 years history of DM, Hypertension, and hypercholesterolemia. He is taking multiple medications (6 tablets/day) but his glycemic, BP and lipid profile control remains inadequate. He was previously taking ramipril, but this was switched to amlodipine due to side-effects. He is currently having HbA1c 8.2%, creatinine 150 mmol/L with deranged lipid profile. He feels well in himself and does not understand why the doctors keep putting him on more and more medications. He needs addition of medication for his deranged renal functions and to lower his cardiovascular risk.

Your task: to discuss with him abnormal test results which could aggravate his cardiovascular risk, and to incline him to start new medications for risk reduction.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in diabetic clinic. Are you Mr __________? Well, nice to meet you sir."*

▶ Agenda setting

- *"Well, I am here to discuss with you about your medical condition, the results of your tests and what I can do further for you. Is that ok? Before I proceed further, will you tell me how you are feeling now?"*

▶ Tell

- *"Well, you have different diseases, so what do you know about them? Do you have some idea that why you are being treated for them?"* ***(Patient's insight)***
- *"I am concerned as some blood tests are not coming out to be normal including your blood fat levels, sugar levels, kidney functions and BP; and I need to see what I can do further. The reason I am worried about these various issues is because they work in combination to put you at high risk of heart disease and stroke and this is the reason that we need to control these various health concerns."*

▶ Help & Explain (Body of skill)

- *"What all medications you are taking? Are you taking all the prescribed medications? Do you have any difficulty in taking them like forgetfulness, complicated dosing or timings? If you forget to take medicine you can have written reminders, box reminders or alarms. You can also tell your other family members or friends to remind you."*
- *"Do you have side effect of any medicine? (Example: muscle pain due to simvastatin) Right, I can't stop simvastatin because your cholesterol level should be well controlled to protect your heart, to control your BP and to save your kidneys. So, what can I do, it is suggested and recommended that I can change simvastatin with some other brand like rosuvastatin or atorvastatin which will have some different side effects profile. Is that ok?"*

Q: Are all of these different problems I have really serious? Could they be life-threatening?

- *"I am concerned about your deteriorating kidney functions, which seems to be due to combination of your inadequately controlled hypertension and diabetes mellitus. Can you please tell me that do you already have problem with your renal functions? I can suggest you the scan of your kidneys if you didn't have the problem previously. Otherwise I may start some other medication which will protect your kidneys and will also control your blood pressure. Its name is angiotensin receptor blocker. Is that ok?"*

Q: There is no way I am going on another medication for my BP, the last time I had that horrible tablet which gave me such an annoying cough!

- *"Your kidneys are important, and I want to prevent its deterioration. So, for this I am going to add this medication. It is not likely to have same side effects rather have a different side effect profile which is less."*

Q: I don't know what all you doctors are playing at – I've told everyone I'm feeling perfectly fine but yet you keep putting me on tablet after tablet!

- *"Your disease control is important that's why we are giving you so much medications. I can advise you once daily formulations instead of TDS formulation so that number of tablets can be reduced."*
- *"I am going to give you written record of all the medications you have to take including the changes which I have made."*

▶ Referrals

- *"Do you have regular check-up for your eyes, heart and feet?"*
- *"I will book your appointment with the GP. I am also going to make your appointment with the diabetic nurse."*

▶ Reassure

- *"I will closely monitor you for any side effects and the response to the treatment. You can always discuss any concern you have with my team, your GP or practice nurse."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

Barriers for non-adherence to treatment:

- **Patient-centred:**
    - Memory problems: Use written reminders, dosette box reminder, alarms and polypills.
    - Poor eyesight
    - Depression
    - Embarrassment of taking tablets/ injections in public places
    - Reluctance to share diagnoses with family and friends
    - Variable perceptions about severity of illnesses.
- **Clinician-centred:**
    - Inadequate time spent to educate the importance of each medication and the potential side-effects.
    - Provision of inadequate detail about morbidity and mortality to make understand about seriousness of condition.
- **Medications-centred:**
    - Polypharmacy
    - Multiple daily regimes
    - Drug interactions
    - Media reports about safety issues of drugs.

12. Offering blood transfusion

Your role:	You are the doctor in a haematology clinic
Problem:	Discussing blood transfusion
Patient:	Mr Alamgir Raja, 80 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient has been referred to you due to tiredness and normocytic normochromic anemia (Hb 7.2 g/dL). His upper GI endoscopy and barium enema is normal except mild diverticulosis in the large bowel. He is suspected to have myelodysplasia. Consultant suggests offering him blood transfusion of 2 units.

Your task: to explain the results of the tests and offer a blood transfusion.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in blood clinic. Are you Mr. _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having some tiredness and some tests were done on you. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the test's results and what we can do further. Is that Ok? Before I proceed further, will you tell me how you are feeling now?"*

▶ Tell

Q: Do you know what the cause of my low blood count is?

- *"Well, your results showed that your tests (barium enema and endoscopy) are almost normal."*
- *"It is unlikely that the diverticulosis itself would have caused the anaemia. Your low blood count seems to be due to your bone marrow which is not as active as it was previously. So, few blood cells are being produced. It could be the cause for your low blood counts and your tiredness as well."*
- *"The best possible way to manage your low blood count is blood transfusion. How you feel about having a blood transfusion?"* ***(Golden silence)***

▶ Help & Explain (Body of skill)

Q: Will this blood transfusion sort the problem out once and for all?

- *"I appreciate your concerns, but blood transfusion is being given in your best interest. The advantage of blood transfusion will be that your blood counts will be improved, and your tiredness will get better. Although other treatments are available, but there is no suitable alternative in terms of tablets to reverse your blood count."*

Q: Is there any risk of blood transfusion?

- *"Blood transfusion is safe, and it is given after proper checking that wrong blood is not given (after checking correctness of blood typing, cross-matching, matching patient identification labels with the labels on the blood bag)."*

Q: I've heard of people getting nasty infections from blood transfusions – is that going to happen to me?

- *"It is also checked for bugs including HIV, hepatitis B and C. Therefore, the risk of contracting a bug is extremely small."*

- *"Other risks include allergic reactions to the blood, which present as itching and wheals within minutes of commencing the transfusion. If there are any complications, we can manage it."*

▶ Referrals -

▶ Reassure -

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far." **(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall

- *"I will arrange the date for blood transfusion if you are inclined."*
- *"Your consent and your wishes will be appreciated and as you will say we will do. Take time to think."*

Transfusion Reaction

Febrile non-haemolytic transfusion reaction:

- Characterised by pyrexia which occurs within minutes of starting transfusion and is caused by cytokines present within the transfused blood. Its incidence has reduced due to transfusion of leukocyte depleted blood components. It is important to differentiate it from haemolytic transfusion reaction.

  Management:
  - Stop transfusion and discontinue the unit.
  - Paracetamol for pyrexia
  - Antihistamines for minor allergic reactions

Immediate-Type Hypersensitivity Reaction:

- Characterised by urticaria, erythema, maculopapular rash, periorbital oedema, bronchospasm and hypotension.

  Management:
  - Stop transfusion
  - Colloids to maintain BP
  - Hydrocortisone
  - Antihistamine
  - Adrenaline where necessary

Acute Hemolytic Transfusion Reaction:

- Caused by Anti-A and anti-B IgM antibodies. As little as 4 ml of transfused ABO incompatible blood can be fatal. ABO antigens are present from birth, whereas ABO antibodies are usually acquired in the first 6 months of life. Anti-O antibodies do not exist

Transfusion Related Acute Lung Injury:

- Characterised by acute respiratory distress, severe hypoxia, fever, and a perihilar / nodular shadowing in the mid & lower zones on CXR, soon after transfusion with no other apparent cause. Patients have normal CVP and normal/low pulmonary wedge pressure. It is thought to be related to anti-HLA or anti-granulocyte antibodies in the donor blood. It is seen more often in when multiparous women donate blood, because of generation of antibodies to HLA antigens through multiple exposures to foetal blood.

  Management:
  - Management of TRALI is consistent with the management of ARDS itself.

Delayed Hemolytic Transfusion Reactions:

- Characterised by unexplained pyrexia, jaundice or unexplained drop in haemoglobin. Occurs 5-10 days after transfusion due to the development of red cell alloantibodies. Urinalysis shows urobilinogenuria and a blood shows fragile ballooned spherocytes. Diagnosis is confirmed by a direct antiglobulin (Coombs) test that detects the presence of antibody on RBCs with red cell agglutination.

13. Hormone replacement therapy

Your role:	You are the doctor in a medical follow-up clinic
Problem:	Discussing hormone replacement therapy
Patient:	Mrs. Robina Khalid, 55 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A female was treated for pneumonia 6 weeks ago. She has made a full recovery now with complete resolution of x-ray. Her main concern now is intermittent hot flushes. She suspects now to be having menopausal symptoms and want an advice on whether she should try hormone replacement therapy or not. She is concerned about the risk of thromboembolism which she has read in women's magazine.

Your task: to determine whether she would benefit from HRT and discuss the pros and cons of HRT.

▶ Greeting

- *"Hello! Good morning. I am Dr ____________________, one of the doctor in the outdoor clinic. Are you Mrs. __________? Well, nice to meet you madam."*
- *"How are you feeling now? Well, I have a good news for you, your x-ray is normal, and your chest infection has resolved."*

▶ Agenda setting

Q: I think I may be menopausal. Should I have HRT?

- *"Ok. I appreciate your concerns. Would you tell me why you are thinking you are menopausal?"*

Q: I had hysterectomy 14 years ago for uterine fibroids and I do not have any periods. Now I am having hot flushes for the last 5 months.

- *"Mrs. __________, what other symptoms you are having? Do you have any vaginal dryness, painful sexual intercourse (dyspareunia), stinging while passing waters, any frequency or urgency of water works **(urogenital atrophy)**; mood changes or loss of libido?"*

▶ Tell -

▶ Help & Explain (Body of skill)

- *"What do you know about HRT? ...... You want me to tell more about it?"*
- *"What do you know about menopause? ..... Hormone levels (oestrogen) in the women with the age become less due to less function of reproductive glands and this causes menopause. This can be confirmed by testing your blood hormone levels (oestrogen levels). The reason for giving HRT is to increase the oestrogen levels and so prevent or treat clinical features associated with the menopause."*

Q: What ingredients are in HRT?

- *"The components of HRT are natural oestrogens with or without progesterone. Since you do not have a uterus, progesterone is not needed in addition to oestrogen (in women with a uterus, the progesterone is required to prevent endometrial hyperplasia and carcinoma)."*
- *"The progesterone can be given cyclically or continuously. During a 28-day cyclical treatment, progesterone is given for 10–14 days, so producing monthly withdrawal bleeding. During 3-monthly cyclical treatment,*

progesterone is given for 14 days with the aim of producing a quarterly withdrawal bleed. The cyclical progesterone therapy minimizes the development of oestrogen-induced endometrial hyperplasia."

Q: How HRT can be given?

- *"HRT can be given by different ways (systemically or topically). Systemically includes tablets by mouth, on the skin (transdermal) or a subcutaneous oestrogen implant. Topically is via vaginal creams, rings or pessaries."*

Q: What are the advantages of HRT?

- *"You will have improvement of your menopausal symptoms like hot flushes you are having; it will also protect your bones and will strengthen them and will prevent them from fractures."* ***(Advantages)***

Q: What are the risks of taking HRT? Can it cause dangerous blood clots and breast cancer?

- *"Ok. Well, I appreciate your concerns. It is seen that the risk of blood clot in the blood channels of legs becomes more (2 to 4 times higher) but still the risk is very small. After 10 years of use, there is slightly increased risk of developing breast cancer and endometrial cancer. Previously it was not clear, but now the research have revealed that the women on HRT are at higher risk of heart attacks (30% higher risk) and stroke so doctors are now more careful."*
- *"There are other unwanted effects of HRT which are oestrogen-related like breast swelling and tenderness, nausea, increased appetite, weight gain and vaginal discharge. Also, these resolve in three months."* ***(Disadvantages)***
- *"Do you have any past history of clotting of blood in blood channels, breast cancer or coronary heart disease; or history of such diseases running in the family? Do you smoke?"* ***(Take brief history of CAD risk factors)***
- *"The women who do not have risk factors, definitely the benefits are more than the disadvantages."*
- *"Many doctors now in routine usually do not recommend the HRT in post-menopausal women. However, still it can be used at a low dose for a few months to relieve menopausal symptoms."*

Q: I can't take HRT. Is there any alternative?

Lifestyle measures

- ***Regular exercise:*** *reduce hot flushes and improve sleep.*
- *Balanced diet:*
- ***Stay cool at night*** *– wear loose clothes and sleep in a cool, well-ventilated room*
- *Cut down on caffeine, alcohol and spicy food: all been known to trigger hot flushes*
- *Try to reduce stress levels: to improve mood swings*
- *Give up smoking*
- *Try vaginal lubricant or moisturizer: if vaginal dryness*

Tibolone (brand name Livial)

- *"Prescription medicine similar to taking combined HRT (oestrogen and progestogen). It's taken as a tablet once a day."*
- *Side effects:*
    - Tummy (abdominal) pain, pelvic pain, breast tenderness, itching and vaginal discharge; increased risk of breast cancer and strokes.

Antidepressants

- *SSRIs and SNRIs: These medicines are not licensed for this use*

Clonidine:

- *Prescription medicine with very small effect on reducing hot flushes and night sweats. It may take 2 to 4 weeks to notice the effects of clonidine.*
- *It does not affect hormone levels, so unlike HRT it does not carry an increased risk of problems such as breast cancer.*
- *Unpleasant side effects:*
    - Dry mouth, drowsiness, depression and constipation.

Bioidentical or "natural" hormones

- *Not recommended*

▶ Referrals/Leaflets & societies

- *"I will try to get some leaflets from the gynaecology and bone clinics and will send these to you in the post."*
- *"I can book your appointment with the GP. I will let the GP know of today's discussion."*

▶ Reassure -

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

14. Lifestyle adjustments after MI

Your role:	You are the doctor in a post-coronary care ward
Problem:	Discussing lifestyle adjustment after MI
Patient:	Mr. Jamshaid Rana, 70 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A male patient was admitted with chest pain and diagnosed with anterior STEMI. Primary PCI was done 5 days ago, and he is now being discharged. He has remained quite well over last few days and has been seen often walking through the ward. He is about to go home but no one has explained him what a heart attack is. He wants to speak to you about few unanswered questions.

Your task: to answer his queries regarding his MI and give him advice on adjusting his lifestyle after an MI.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctors in heart ward. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having some chest pain and you were treated for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your medical condition. So, before I proceed further, would you tell me that do you have any question?"*

▶ Tell

Q: Have I really had a heart attack?

- *"Yes, you were having the heart attack. It was confirmed with ECG and blood test (cardiac enzymes). Do you want me to tell what it is and how it happened? ...... Heart attack is caused by blockage of blood channels of heart because of clots. This causes damage to some part of the heart and presents as chest pain which is called by doctors and nurses a myocardial infarction or MI."* ***(Golden silence)***

▶ Help & Explain (Body of skill)

- *"You were given the best possible treatment with immediate intervention to open the blocked channels of your heart. And many people do well after heart attack and spend usually a normal life."*

Q: I cannot understand why I am on so many tablets when I feel so well.

- *"I have given you many tablets. This is for prevention of another heart attack after the first one. There is importance of every tablets like for lowering your blood fat levels simvastatin, for blood thinning aspirin and clopidogrel; to control the heart beating bisoprolol, etc. These tablets are important for prevention of another heart attack."*

Q: What will happen next? Would I have to see the specialist again?

- *"Now you will have a scan of your heart (echocardiograph) within the next 6 weeks to look for any complications from the heart attack."*
- *"I will also advise you to enrol yourself in cardiac rehabilitation program and the specialist nurses responsible for this will be in touch with you within the next couple of weeks. The cardiac rehabilitation program will allow you to meet other people like you, enabling you to share your experiences with them. The rehabilitation team will be there to support you and to answer any other queries. The rehabilitation program will consist*

initially of simple basic exercises which will be slowly increased as you gain more confidence in your exercise ability. If you have any problems with anxiety and stress, then the program will give you relaxation therapy".

Q: Would I have to change my lifestyle?

- *"Yes, you have to take care for your diet, give up smoking, and add exercise into your life. We are pleased to note that you do not smoke anymore, and you are not overweight. But still you need to cut down your fat intake because it can affect your heart. Although I am giving you tablets for high blood fat levels but still you need to cut down your fat intake to keep blood fat levels on lower side. I will ask a dietician to give you advice at an outpatient appointment."*
- *"Regular exercise has benefits for preventing further heart attacks. You need to go for regular brisk walk 20-30 minutes at least 5 times a week, after gradually increasing your activity to this level."*
- *"You need irregular check-up for high blood pressure and control of your diabetes."*
- *"You need to stop driving for a month and must inform the DVLA and your insurance company."*
- *"You can have sex only after increasing your activity levels to going briskly up two flights of stairs with no difficulty, after 2-4 weeks of exercise program."*

▶ Referrals/Leaflets & societies

- *"I will book your appointment for scan of your heart, dietetic advice and for cardiac rehabilitation and will let you know before you leave the ward."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall

- *"I will be in touch with you again soon in the clinic in a few weeks."*

Cardiac rehabilitation program

Phase 1: initial stage after MI during hospital stay

- Encourage to give up smoking, healthy balanced diet, cut down fat intake
- Education
- Initial mobilization
- Plan for discharge

Phase 2: Post-discharge stage

- High levels of depression and anxiety are common after an MI. So, screen and treat it with suitable non-cardiotoxic antidepressants.
- Manage stress, particularly in a group setting.

Phase 3: structured exercise and rehabilitation

- **Graded exercise:** Physiotherapy-led exercise program with an initial warm-up followed by an individual exercise prescription consisting of the cycle and/or floor circuits. Patients should be advised to undertake physical activity for 20–30 min a day to the point of slight breathlessness. Close observation of the heart rate is needed, with particular reference to reaching target heart rates and maintaining these rates during exercise.
    - **For low-to-moderate risk patients:** Aerobic low-to moderate-intensity exercise undertaken either at home or under supervision in the community (leisure centres where staff have received basic life support training).
    - **For high-risk patients:** carried out in a hospital or other suitable venue with resuscitation facility.
- **Lifestyle changes:** should be encouraged e.g., weight reduction, smoking cessation, and retraining with a view to returning to work.

Phase 4: long-term maintenance

15. Smoking cessation

Your role:	You are the doctor in the general medical clinic
Problem:	Discussing cessation of smoking
Patient:	Mr. Musa Jabran, 55 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient presented with progressive breathlessness and found to have severe COPD on lung function tests. He is a heavy smoker, smoking 40 cigarettes a day since he was 12. He regards smoking as his only pastime. He never thought of stopping it, rather he attributes his breathing problems to his occupational exposure to the coal furnaces. You feel that he should be advised to give up smoking because of his severe COPD.

Your task: to explain smoking hazards, beneficial reasons for giving up smoking and suggest how to stop it.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the medical clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having some breathlessness and test to measure the functions of your lung was done. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your medical condition and what we can do further for you. Is that Ok? Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

Q: What happened to me?

- *"Well, based on the history given by you and after seeing your test for measurement of lung functions, your symptoms are due to smoker's lung disease, called by doctors and nurses as chronic obstructive pulmonary disease (COPD)."* ***(Golden silence)***
- *"Do you know about COPD or you want me to tell about this?*

▶ Help & Explain (Body of skill)

Q: What is COPD or smoker's lung disease?

- *"It is a persistent and progressive lung disease characterized by obstruction to the airflow within air passages caused by damage due to persistent exposure to poisonous substances such as tobacco smoke and indoor or outdoor air pollution. Chronic means persistent, obstructive means air flow restriction and pulmonary means lungs."*
- *"In your case, smoking has contributed to the development of COPD and this condition will worsen rapidly if you continue to smoke."*

Q: Are you sure that my breathing problem is because of smoking? I believe that it is due to my exposure to coal furnaces rather than to smoking, as I worked there.

- *"Well, your previous job might also have contributed to the development of this condition. But it is most often caused by smoking and the most important treatment is to stop smoking."*

Q: But smoking is my only hobby – you can't take that away from me!

- *"Is that alright if I ask you some personal question? ...... Why do you smoke? ..... Have you ever thought of giving up smoking...? Do you know smoking also affects other members of your family by passive inhalation of smoke?"*
- *(The patient might reply that he lives on his own as his wife died few years ago and he regards smoking as his only pastime. He has never thought of stopping as he believes his breathing problems are due to his occupational exposure.*
- *"Do you have any family history of similar lung condition? Are there any smokers in the family and what is their health like?"*

Q: If you could tell me the benefits of giving up smoking and the health risks of continuing to smoke?

- *"It is never too late to stop smoking and giving up smoking now will help to slow down the rate at which your lung disease will deteriorate. You will notice a difference in your breathing soon after giving up smoking and you will also be financially better off."*
- *"Smoking causes premature death and a number of other cardiovascular and respiratory diseases. If you stop, then your risk of developing lung cancer will also start to fall."*

Q: Can you offer me any help to stop smoking?

- *"Many people have successfully stopped smoking. But, to have a better chance of success, you must have desire and willpower to stop it."*
- *"Yes, there are stop smoking treatments available, and are encouraged because results are better. They include nicotine replacement therapy, varenicline and bupropion. We can help you decide which type of treatment is right for you and how to use it."*
- *"Nicotine replacement products (nicotine gums, patches, inhalator, mouth or nasal sprays) provide you low levels of nicotine without tar, carbon monoxide and other poisonous chemicals, and help to prevent nicotine withdrawal symptoms if you are afraid of them. These symptoms include intense cravings for nicotine; tingling in the hands and feet; sweating; nausea and abdominal cramping; constipation and gas; and headaches."*
- *"The stop smoking tablets include varenicline (Champix) and bupropion HCl (Zyban), although the latter is used less frequently now."*
- *"If you are interested in varenicline, before starting a course, I would like to ask few questions about your past medical history. Do you have any previous history of severe depression or any suicidal thoughts? .... We need to monitor very closely the patients who have psychiatric diseases while they are taking varenicline."*
- *"But if you are interested in bupropion, there are certain conditions in which it cannot be prescribed like a current seizure disorder, severe hepatic cirrhosis, bipolar disorder, bulimia/anorexia nervosa, known central nervous system (CNS) tumour, abrupt withdrawal of alcohol or benzodiazepines, concomitant usage of monoamine oxidase inhibitors (MAOIs), antimalarials, tramadol, quinolones, sedating antihistamines."*

Q: Will I gain weight if I will give up smoking?

- *"Smoking causes weight loss due to production of a chemical within the body called TNF alpha. After giving up smoking you might gain weight which needs to be addressed by adhering to balanced diet."*

▶ Referrals

- *"I will provide smoking cessation leaflets and a 'quit smoking' helpline number. You can also get more information from your GP or local pharmacist."*
- *"I will book your appointment with smoking cessation specialist nurse with whom you can discuss the matter again."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"Take your time to think over it to make a decision. We can make a next appointment after 2 weeks in the clinic to know about your decision."*

Advice on smoking cessation

- Make a list of reasons why the individual might want to stop, e.g. health, setting a good example to others (children), financial, social, e.g. smell, managing without a smoke in public places
- Stop completely: To cut down and then stop is actually very difficult to do in practice, and likely response is smoking each cigarette more intensely. The best approach is to go for a complete break.
- Provide professional helplines numbers (NHS smoking helpline and Quit for information and advice)
- Involve family or friends; find a partner who also wants to quit.
- Explain nicotine withdrawal symptoms (restlessness, irritability, lack of sleep)
- Set a date for preparing mentally.
- Provide nicotine replacement therapy for withdrawal symptoms; the strength of gum or patches will depend on how heavily patient has smoked.
- Avoid temptation: Difficult first few days. Change routine to avoid situations where he would usually smoke.
- Deal with weight gain worries
- Watch out for a relapse.
- Hypnosis, acupuncture or other treatments: little formal evidence supporting their effectiveness. But if they help then they will have had some value. Herbal cigarettes are pointless (the individual gets all the tar but nothing to help deal with the nicotine withdrawal).

16. Starting insulin therapy

Your role:	You are the doctor in the diabetes clinic
Problem:	Explaining the importance of treatment
Patient:	Mrs. Shaista Zaidi, 45 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This female patient with T2DM on maximal oral hypoglycemics have persistently high HbA_1c levels (13 - 15 %). She has been having more osmotic symptoms during the last 6 months. She is required to be started on insulin therapy. She is determined to defer the changeover for as long as she can. Her BMI is 34 kg/m2 and she has normal renal or liver function.

Your task: to discuss with her the present glycemic control, recommend her insulin and address her concerns.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in diabetic clinic. Are you Miss __________? Well, nice to meet you madam."*
- *"Well, I understand that you have diabetes which is not well controlled and although you are on many medications for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your diabetic control and what we can do further. Is that Ok? Before I proceed further, will you tell me how you are feeling now? Are you having increased thirst or passing more waters?"* ***(Ask about osmotic symptoms)***

▶ Tell

- *"Well, I appreciate that you know well about your disease, but our diabetic team is worried that your sugar control is not very good as HbA_1c levels are high."*
- *"Would you like to tell me that had you noticed anything else like, any numbness or burning sensation in your hands or feet* ***(Neuropathy)****, any visual problems* ***(Retinopathy)****, any frothing in your water works* ***(Nephropathy)****?"* ***(Microvascular complications)***
- *"Do you have any history of heart attacks or exertional chest pain* ***(CAD)****, or any pain in your legs on walking* ***(Peripheral vascular disease)****?"* ***(Macrovascular complications)***
- *"Any early satiety* ***(Gastroparesis)****, any light headedness on suddenly standing or dry feet?* ***(Postural hypotension)****, any problem in maintaining sexual relations?* ***(Erectile dysfunction)****"* ***(Autonomic complications)***
- *"It is common for such patients having complications of DM that we are starting them over insulin. How do you feel about that?"*

▶ Help & Explain (Body of skill)

Q: I am not interested to take insulin.

- *"I appreciate your concerns, but could you tell me the reasons why you are not interested to take insulin?"*
- *"Insulin is suggested in your best interest to control your diabetes as well as to prevent it's complications as it is a progressive disease. Insulin treatment has improved over the last few years to minimize the difficulties, and many patients are doing very well after insulin."*

Q: I'm terrified of needles. Can you give me the insulin in any other form?

- *"I appreciate your concerns. There are ways to overcome the needle phobia. One way is that you come to the diabetic centre and one of the nursing staff will demonstrate how to inject insulin with the new equipment and techniques available. If you are incapable of self-administering insulin, then the district nurse can do that for you and even a relative can be taught to do it for you. Ok."* **(For needle phobia)**

Q: Are there any risks of taking insulin injections?

Risk and complications

- *"I appreciate your concerns. Yes, there are risks for insulin treatment such as you can get low blood sugars episodes, but these could be minimized by regular monitoring of blood sugars. You will be started on the lowest possible dose of insulin and the diabetes specialist nurses will keep a close eye on you. We will also tell you the ways how to adjust it like taking the insulin at regular intervals, not missing a snack and by knowing about the hypoglycaemic symptoms."*

Q: Doctor, it seems that you are pushing me to take insulin. Is there any other solution without having to go on insulin?

- *"As your $HbA_{1}c$ levels are high and your diabetic control is poor, so insulin is inevitable. It could be deferred for a couple of months but not more."*
- *"Yes, newer therapies of diabetes are available now like GLP-1 agonists (exenatide or liraglutide) which are not insulin but are useful in some patients. These are also injectable but as you are having symptoms and high $HbA_{1}c$ levels, so these drugs are unlikely to improve your control. Insulin is the best next recommended step. However, if you want to consider these drugs instead of insulin, I will give you more information about them."*

▶ Referrals/Leaflets --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* **(Summarise everything)**
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"Your consent and your wishes will be appreciated and as you will say we will do. Take time to think."*
- *"Well, I can arrange a second meeting and we can discuss the matter again in the second meeting".*

17. Refusal of analgesia

Your role:	You are the doctor in the medical clinic
Problem:	Discussing the reasons for non-compliance
Patient:	Mr. Muhammad Qaiser, 75 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A male patient diagnosed with right apical bronchial carcinoma (Pancoast's tumor) 8 months ago, was given radiotherapy for bony metastasis in the right clavicle with some relief. He has been prescribed morphine 30mg BD due to his increasing pain 4 weeks ago. Hospital nurse specialist is concerned as he has not taken any of the morphine tablets over the last one week, due to that he is suffering greatly from the pain. Patient is fully aware that he has a terminal illness.

Your task: to analyze the patient's pain control and explore the possible reasons for non-compliance.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctors in medical clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you are having chest pain and for that you were given some painkillers. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your pain control and what I can do further for it. Is that ok? Before I proceed further, will you tell me how you are feeling now?"*

▶ Tell

Q: I'm managing my pain, and all is fine.

- *"But the specialist cancer nurse is worried about the pain you are having. Can you please tell me where exactly the pain is? Does it move? Is it constant, or comes and goes? What makes it worse? Do the tablets relieve the pain? How bad it is on a scale of 1-10? Does it keep you awake?"*
- *"How do you feel about pain relief medications? What tablets are you taking for pain? The team is worried that you may not be taking the tablet regularly or not at all."*

  (If patient clearly tells you that he is compliant of treatment and he is symptom free then there is not much else you can do apart from believing. You can still remind him of the benefits of treatment.)

▶ Help & Explain (Body of skill)

Q: Sometimes the pain gets too much. But I don't like taking morphine tablets, then why does everyone keep going on increasing my tablets?

- *"Can you please tell me why you don't like taking morphine tablets? Are you worried about its side effects like addiction, constipation or confusion after taking it? .... I appreciate your concerns. When we prescribe the morphine for pain relief, patients are not addicted of it and the side effects like constipation etc. are minimal, and they can be managed....... Is there any influence from the other members of the family? .... Do you have any fear of taking morphine tablets and dying asleep?"*
- *"Do you have any fear about your disease? Has it resulted in depression? Do you have you any other symptoms like vomiting, reduced appetite with reduced food intake, weight loss, etc.?"*
- *"What is your opinion regarding the other analgesics you have tried?"*

- *"The pain you are having is due to the spread of cancer to your collar bone. The patients who are having involvement of bones due to the spread of cancer, feel much relaxed after morphine use as their pain settles to much extent. Although, morphine has unwanted side effects like nausea, constipation, hallucinations, myoclonus, delirium, respiratory depression, but it is helpful if pain is unbearable. The other option is diamorphine (subcutaneous via a syringe pump) or fentanyl skin patch (transdermal)."*

Q: Are there any alternative for pain relief?

- *"Yes, there are different therapies to treat the pain. There are psychological treatments and medical treatments. In the psychological treatments, there are different strategies. I will tell you the three types, spiritual pathway, relaxation technique and persisting with task despite pain. In the medical treatment, we are giving you tablets for pain relief."*
- *"I would like you to have x-rays to look for any further bony deposits and, if this is suspicious, then I would like you to have an isotope bone scan. Would you consider further local radiotherapy if another bone deposit is detected?"*

▶ Referrals --

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall

- *"Well, I can arrange a second meeting and we can discuss the matter again in the second meeting."*
-

D. GENERAL CLINICAL PROBLEMS

- HIV testing
- Communication of HIV positive results
- New diagnosis of tuberculosis
- Non-compliance with ATT
- Multi-drug-resistant TB
- ‘Hospital superbug’ 1 (Clostridium difficile)
- ‘Hospital superbug’ 2 (methicillin-resistant Staphylococcus aureus)
- Assessing suicide risk
- Genetic counselling
- Fitness for anaesthesia/surgery
- Screening for prostate cancer

18. HIV testing

Your role:	You are the doctor in an infectious disease's clinic
Problem:	Discussing about HIV testing
Patient:	Mr. Ameen Qazi, 35 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A 35 years old man presented to his GP with fever, faint red rash over the body and myalgia 3 weeks ago. He was noted to have pharyngitis and oral mucocutaneous ulceration. He is a gay and has a history of drug abuse. GP is wondered about the possibility of primary HIV infection. GP has referred him to the Infectious disease's clinic for further advice and testing.

Your task: to discuss the possibility of HIV infection as a cause of patient's symptoms and counsel him for an HIV test.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctors in the clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having fever, rash and some body pain. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your condition and what we can do further. Is that Ok? Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

- *"Now thinking of your lifestyle, have ever you thought of acquiring any sexually transmitted infections like hepatitis B, C or even HIV? .... I am concerned that your current clinical situation might be related to sexually transmitted infection like HIV."* ***(Golden silence)*** ...... *"Is it ok for me to continue?"*

▶ Help & Explain (Body of skill)

- *"Ok. I understand that you have a history of taking drugs through blood channels. Is that correct? Please tell me more about it .... How you inject the drugs? Do you share the needles? How many companions you have? Were any of them known to be HIV positive? Were you abstinent from taking drugs ......? For how long? Do you use heroin by other means, e.g. smoking?"* ***(Silence to avoid interrogation gestures)***
- *"I would like to ask a few more personal questions, is that ok? ..... Do you had unprotected sex with someone who is HIV positive (or of unknown status); shared a needle for piercings, tattoos or drugs; or had contact with other body fluid or blood contact with persons at risk for HIV infection?* ***(Brief risk assessment)***
- *"Whether you ever had a test for HIV? Would you consider it now?"* ......

Q: Everyone will know if I have the test and that could be bad for me.

- *"It will be kept confidential and result would not be released to anyone without your consent. Only the staff and the GP looking after you will be informed, and this is only because this is needed for your proper follow up and if you have any problem, they will handle you better* ***(encourage)****."*
- *"If you undertake the test and if it is positive then you need to tell your sexual partners and the partners with whom you were sharing the needle* ***(essential)****."*

Q: Are you saying that you think I have AIDS?

- *"This test is not for AIDS, nor for the disease but it is only for the HIV bug. AIDS is a condition. Contracting HIV can lead to the development of AIDS (stage 3 HIV) when HIV has caused serious damage to the defence system."*

Q: If I agree to have the test what will happen?

- *"A sample of blood is taken, and the result should be available within a day or two. Sometimes the first test can be negative and then a repeat test is recommended in up to 2-week time. (a negative HIV test will not be reliable for 3 months from date of risk)"*
- *If the HIV test is positive, you will need further assessments and tests to determine if you have signs of a severely compromised immune system or other illnesses/infections. Depending on these, it will be determined if you have AIDS. However, many patients with HIV infection does not develop the disease AIDS, especially if the patient has early diagnosis, regular monitoring and timely treatment."*
- *"However, I understand and acknowledge that this news must be difficult for you. You can take time whether now you want to decide, or you want to take some time."*

Q: What are the different types of HIV test?

- *There are different types of tests like 10-minute positive test, early positive test and 2-week positive test."*
- *"A negative test does not mean that the person is immune to or will never get the infection in the future."*

Q: Are there benefits of being tested for HIV?

- *"There are many benefits of being tested. If the test is positive then the treatment can be started early, monitoring can be early, you can be prevented from complications. You can take precautions to avoid transmission to others and engage in healthier behaviour."*

  Remember: In a woman of child-bearing age, discuss the implications of having HIV during pregnancy, and transmitting the virus to her child during pregnancy, during delivery or while breastfeeding.

- *"I can also understand that it can raise anxiety levels and possibly cause discrimination at your workplace or affect future insurance policies if tested positive."*

Q: When the results of test will be communicated?

- *"The results will be communicated to you typically in about 2-3 days, unless a rapid antibody test has been done." (Communicated face to face together with an HIV specialist nurse or counsellor).*

Q: How can it affect future insurance policies?

- *"Whatever insurance you took before, if your test came out to be positive, the prior insurance will be honoured although you may find difficulty taking out future policies."*

▶ Referrals/Leaflets & societies

- *"You can have support in genitourinary medicine clinic of this hospital and others member of staff will be there for your support any time during the day. I can give you contact details of these services before you leave."*

▶ Reassure

- *"Please avoid sex or use condoms and also avoid sharing needles before we know the results of your tests. This is for the safety of your sexual partner as well as your drug partner."*
- *"Do you have any concern that have not been addressed? Ok."*
- *"Can you tell me to whom you want to give the result and who you want to be with you at the time of results?"*
- *"I will explain to you when and who is going to take the blood for test."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"Your consent and your wishes will be appreciated and as you will say we will do. Take time to think."*
- *"Well, I can arrange a second meeting and we can discuss the matter again in the second meeting".*

Risk of acquiring HIV after needle stick injury

- 0.3% of recipients would get HIV based on a hollow needle-stick together with a high-risk donor and a deep injury to the recipient.
- Wearing gloves might reduce transmission by 50%
- As citizens we have a public duty to allow the test in the best interest of the healthcare worker.

Side effects of PEP

- Diarrhoea, vomiting, AKI

Universal 'opt-out' policy for HIV testing:

- Individuals coming into contact with healthcare services are offered an HIV test as routine, but they can refuse it.

UK national guidelines for HIV testing:

- First-line testing should be fourth-generation assays which test for both HIV p24 antigens and IgG antibodies simultaneously. This test can give a positive result within 4 weeks of acquiring the infection and can have a sensitivity and specificity of over 99%. Positive screening test should be repeated with a second sample and also be sent for confirmatory testing.

  Note:

  - 'Point-of-care' testing can give a result as quickly as 10 min and can be done from fingerpick or mouth swab samples. However, since these methods only test for antibodies, the reported sensitivity is lower, especially if the patient is still within the window period (currently 12 weeks).
  - Serological tests usually test for HIV-1 infection. Therefore, patients with HIV-2 infection (which is more prevalent in West Africa) can have an indeterminate result. Other possible causes for an indeterminate result include early stages of seroconversion and advanced HIV infection (when the antigen levels are too low).

Human Tissue Act 2004: code of practice

- In the absence of consent from the patient (now deceased) and the absence of assent being able to be obtained from a 'qualifying person', blood could not be taken for an HIV test for the sole purpose of benefiting another person."

Ethical issue:

- **Is it ethical to perform an HIV test following a needle-stick injury where a patient is unable to give consent? And what if the patient has died?**
  - In the event of a deceased patient being the source of a needle-stick injury and whose HIV status is unknown, the taking and testing of samples requires consent in accordance with the Human Tissue Act 2004. Assuming the deceased did not give consent (or refuse it) while alive, this can be obtained from a "nominated representative" (if appointed) or by a person in a "qualifying relationship" to the deceased.

19. Communication of HIV positive result

Your role:	You are the doctor in the respiratory ward
Problem:	Discussing about HIV testing
Patient:	Mr Bachal Eidhan, 45 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient was admitted 2 weeks ago with breathlessness and dry cough. He was in type 1 respiratory failure, therefore intubated and placed on ventilator support. Chest X-ray and bronchoscopy findings were suggestive of Pneumocystis Jirovecii pneumonia (PJP). The ICU team carried out HIV test (while the patient was intubated), which came out positive and antiretroviral treatment was commenced. He was extubated 4 days ago, but he is not knowing about HIV testing and the results. The ICU team found out from his brother that the patient is known to have contact with prostitutes during business trips. He has been open about this to his brother, whom he is close to, but does not want his wife or children to know under any circumstance.

Your task: to speak to the patient and tell him about all the events and about the positive HIV test and address his concerns.

▶ Greeting

- *"Hello, I am Dr ________________, one of the doctor in the lung clinic. Are you Mr _________? Well, nice to meet you sir."* **(No good morning in breaking bad new)**
- *"Well, I understand that you were having breathing difficulty and for that you were treated. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your clinical condition, about your disease, what we did and what we can do further. Is that Ok? Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

- *"Ok. Do you have some idea what you were having when you came to the hospital? ...... Do you want me to tell more about it?"*
- *"You were admitted with severe form of chest infection that required admission to ICU, breathing support with ventilator machine and other treatments to which you have responded well."*
- *"You were having chest infection. The specific type of chest infection that you were having, the doctors were suspicious that it could be related to the possibility of sexually transmitted infection like HIV. So, the test for HIV was carried out in your best interest when you were sedated in the intensive care unit......"*
- *"Did the possibility of HIV infection has ever crossed into your mind or have you ever tested previously for it?"*
- *"We took out the test for HIV and it came out to be positive".* **(Golden silence)**
- *"Is it alright if I continue more or you want to know more about it?"*

▶ Help & Explain (Body of skill)

Q: What made you think that I might have HIV?

- *"During hospital admission, you were found to have specific type of chest infection called PJP pneumonia. The doctors were suspicious that it could be related to the possibility of sexually transmitted infection like HIV."*

Q: What gave you the right to test me without my permission?

- *"The test for HIV was carried out in your best interest when you were sedated in the intensive care unit."*
- *"Do you know about any risk factors you have been exposed to for acquiring HIV infection, or if you have considered or even had an HIV test in the past? I would like to ask you few personal questions that may provide an understanding of your exposure to HIV risk, is that ok... Had you any unprotected sex with someone who is HIV positive (or of unknown status)? Are you in relationship with someone? (marriage) Do you have regular sexual partners? Any casual contact with someone other than your regular sexual partners (male or female)? Do you exercise safe sexual practices particularly using condoms? Any history of illicit drug use; sharing a needle for piercings, tattoos or drugs in the blood channels; previous blood transfusions or had contact with other body fluid or blood contact with persons at risk for HIV infection?"* ***(Brief risk assessment)***
- *"You have been diagnosed properly and have been started on proper medications against the bug (antiretroviral treatment), and also for your lung infection (PJP). Due to the PJP that was confirmed, you fall into the more severe end of the HIV spectrum known as AIDS. Although, you will need to be on the treatment for an extended period of time, many people with HIV illnesses these days have a reasonably good quality of life and a near normal life expectancy."*
- *"Can you please tell me to whom you wish to discuss the test result with? .... Your diagnosis will be kept confidential and only the staff looking after you will know it. This is only because this is needed for your proper follow up and if you have any problem, they will handle you better* ***(encourage)****."*
- *"You need to tell your wife, your other sexual partners and the partners with whom you were sharing the needle about your HIV test result* ***(essential)****."*

Q: I have several insurance policies (including life and property insurance) and want my HIV diagnosis to be kept confidential.

- *"Whatever insurance you took before, if your test came out to be positive, the prior insurance will be honoured although you may find difficulty taking out future policies. According to GMC regulations about disclosure of patient information for employment or insurance purposes, I want to make it clear that I cannot withhold any relevant information. I would like to obtain your consent to do so (written if possible). Only the information relevant to the request will be provided to them and I can show you a written copy of my report. Even if you refuse to consent to disclosure, I may need to breach confidentiality if it is in the public interest or required by law."*

▶ Referrals/Leaflets & societies

- *"I will book your appointment, as per recommendations, with HIV clinicians, specialist nurse or sexual health counsellor within 02 days (definitely within 02 weeks) with whom you can discuss the matter again. They will monitor your response to treatment, and what the discharge plans are, etc."*

Q: I don't want my wife to know about it under any circumstance because it will 'jeopardise my marriage'?

- *"You need to tell you wife as well as your sexual partners and drug partners. If you can't do it then I can book your appointment with sexual and reproductive health multidisciplinary team, being an excellent resource, they can let your spouse and other partner know."*
- *"You are also advised for contact tracings including the previous sex partners, drug partners with whom you were sharing needles. Can you please tell me their addresses so that appropriate counselling can be done for them?"*

▶ Reassure

- *"Your diagnosis will be kept confidential and only the staff looking after you will know it. You need to inform your GP and to your wife."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall

- *"I can arrange another time for you to come back and speak again either today or tomorrow so that you should understand the information given to you and can ask any questions if you have."*

Ethical issues

- New cases of HIV who test positive should see HIV clinicians, specialist nurse or sexual health counsellor within 02 days and definitely within 02 weeks.
- Protect society and other individuals from the effect of communicable disease or serious crime' if patient continues to engage in risk-taking behaviour. If patient refuses to give consent for disclosure, breach the confidentiality after weighing the harm that may arise from non-disclosure, in terms of public interest.
- According to GMC regulations, the patient information can be breached if it is in the public interest or required by law like for employment or insurance purposes. If the patient refuses to consent about disclosure of his information, make it clear to the patient that you cannot withhold any relevant information. Obtain their written consent to do so if possible. Only reveal factual information relevant to the request and offer to show the patient a written copy of your report.

Vertical transmission HIV

- Without interventions, rate of vertical transmission is 15-20%; prolonged breastfeeding doubles this, falling to <2% with antiretroviral prophylaxis, elective Caesars and bottle feeding.
- To reduce vertical transmission with perinatal antiretroviral for HIV +ve mothers ± Caesarean birth ± bottle-feeding.

Needle stick injury

(In unvaccinated person)

- Seroconversion rate ~0.3% for HIV; 3% for HCV; 30% for hep B if HBeAg +ve.

Post-exposure prophylaxis (PEP)

- Encourage the wound to bleed, ideally under running water. Don't suck or immerse in bleach. Wash well with soap and running water. Don't scrub.
- Note name, address, and clinical details of donor.
- Report incident to Occupational Health and fill in an accident form.
- Store blood from both parties (HIV, HBV & HCV tests).
- Immunize (active & passive) against hepatitis B at once, if needed.
- Counsel and test recipient at 3 and 6 months.
- Weigh risks by questioning donor; if HIV +ve, what is the CD4 & viral load count?
- Before prophylaxis, do a pregnancy test. Was the inoculum big? Was injury deep?
- Start PEP in case of a significant exposure to blood or other high-risk body fluid from a HIV +ve source, or any source which is at high risk of HIV infection. PEP is not indicated after low risk exposures (e.g. urine, vomit, saliva, faeces, unless they are visibly bloodstained). Start PEP as soon as possible (certainly within 48-72 hours) and continue for at least 28 days. PEP is not needed beyond 72 hours post-exposure. Do follow-up testing at 12- and 24-weeks post-exposure (or 24 weeks after cessation of PEP) and continue for at least 12 weeks after the HIV exposure event (or for at least 12 weeks from when PEP was stopped).

  Starter regimen: One Truvada tab (245mg tenofovir and 200mg emtricitabine) once a day plus two Kaletra® film-coated tabs (200mg lopinavir and 50mg ritonavir) twice a day. Truvada® Kaletra® is the preferred regimen, but Combivir® Kaletra® may be considered as an option if there are difficulties sourcing starter packs containing Truvada®.

Hepatitis B vaccination:

- 1 mL into deltoid; repeat at 1 & 6 months (child: 0.5 mL x 3 into the anterolateral thigh). Immunocompromised may need further doses.
- **Anti-HBS (IU/L) levels**
  - >1000: Good level of immunity, retest in ~4 years.
  - 100-1000: Good level of immunity; if level approaches 100, retest in 1 year.
  - <100: Inadequate; give booster and retest.
  - <10: Non-responder; give another set of 3 vaccinations. Retest; if <10 get consent to check hepatitis B status: HBsAg + ve means chronic infection.

20. New diagnosis of TB

Your role:	You are the doctor in the respiratory clinic
Problem:	Discussing diagnosis of TB
Patient:	Miss Amna Bibi, 25 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A Nigerian Pakistan immigrant young lady working in a residential home presented with fever, night sweat, cough, weight loss for the last 6 months. Bronchoscopy was carried out which shows acid-fast bacilli and MTB was also grown on the culture. She has visited back the clinic to find out the results of bronchoscopy.

Your task: to explain the diagnosis of TB, the results of bronchoscopy and management to the patient.

▶ Greeting

- *"Hello! Good morning. I am Dr ____________________, one of the doctor in the lung clinic. Are you Miss __________? Well, nice to meet you madam."*
- *"Well, I understand that you were having cough, fever and weight loss; and for that some tests were done on you. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the results of your tests and what we can do further. Is that Ok? Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

- *"Ok. Do you have some idea that what could be the results of your tests and why it was done? Or anybody has discussed with you?"*

Q: What is the result of the test I had?

- *"Well, I have the results of your tests which were done for you and it is showing that you have infections of your lungs, a condition called tuberculosis." **(silence)***

▶ Help & Explain (Body of skill)

- *"Do you know about TB, or any family or friends who have been diagnosed with it before? ..... As you are from a country of high prevalence, you were probably exposed to it in the past, but it became clinically apparent now."*

Q: Can you make me better?

- *"There are treatments available which should be taken for 06 months. Many patients do well as it is curable disease. Although, there is a chance of reactivation in the future, if you become unwell or immunocompromised for any reason."*
- *"Local TB services will be informed about you and you will be closely followed up and monitored by them. You will have a named key worker and should be given the contact details of the key worker before you leave the clinic. Your GP will also be informed."*
- *"As it is a notifiable disease so the department of health will be notified."*

Q: Could my family get it?

- *"We will carry out the contact tracing as well, by offering screening of TB in all the persons who were sharing room, kitchen, bathroom with you; and in your friends/ frequent visitors at the home. We will take the names of all these individuals and will provide to local TB services and your GP who will do the contact tracing by offering screening of TB to these individuals. We will do the tests on them and if they are found to be positive then we may give them the treatment for some time (for latent or active TB)."*

Q: What am I going to do if I can't work?

- *"Regarding your job, the occupational health department will be informed, and you need to discuss with them that whether you can carry your job or not. Usually if phlegm is negative and you are on the treatment for 02 weeks, you can carry out your job."*
- *"Do you have any concern that have not been addressed .... ok"*

Q: Are there any unwanted effects of this treatment?

- *"Yes, there are side effects of medicine and we are also monitoring the patient for the side effects and these side effects are manageable."*

Q: Can I have air travel?

- *"Regarding air journey, for the open tuberculosis like phlegm positive or if the patient is very symptomatic and not on treatment, then the air journey is not allowed."*

▶ Referrals/Leaflets & societies

- *"I will book your appointment with the local Health Protection Agency (HPA) so that contact tracing can be carried out."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall (& follow ups with contact details)

- *"I will be in touch with you again soon in the clinic."*

- For latent, non-active TB, NICE recommends carrying out a Mantoux test and if this is positive or the results unreliable then to consider interferon-γ immunological testing, if available. IGRA is a serological test which measures the interferon-γ released by T-cells in response to stimulation by M. tuberculosis antigens. It has a specificity of > 95% for a diagnosis of latent TB infection. The results are not affected by prior BCG vaccination.
- Once a diagnosis of TB is made, the patient should be referred to a specialist (usually a respiratory physician).
- For meningeal TB, the initial treatment is the same with four drugs for the first 2 months but, following this, the isoniazid and rifampicin should be continued for a total of 12 months. A glucocorticoid (normally prednisolone 20–40 mg) should be given initially with gradual withdrawal after 2–3 weeks.
- Treatment of latent TB is with 6 months of isoniazid or 3 months of isoniazid and rifampicin.
- You may also be expected to consent the person for an HIV test at the same time.

21. Non-compliance with ATT

Your role:	You are the doctor in the respiratory clinic
Problem:	Discussing issue of non-compliance with ATT
Patient:	Mr Peter Shah, 20 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A patient diagnosed with pulmonary tuberculosis 2 months ago (smear positive) is still having cough, sputum, weight loss. CXR does not show any improvement. Cultures have revealed fully sensitive Mycobacteria tuberculosis. He works as a glass collector in a nightclub. TB health visitor is not convinced that he is compliant with ATT as has only picked up one prescription (2 weeks supply) on the first day of treatment, 2 months ago. He has visited clinic after missing his previous 04 visits over 02 months. You are concerned as he is still symptomatic and infectious due to poor compliance with the medication. Patient is also not inclined for admission.

Your task: to approach the patient on issue of non-compliance and negotiate ways of improving his compliance.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the lung clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having tuberculosis and you were given treatment for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your condition and your treatment and what we can do further. Is that Ok? Before I proceed further, first of all I will thank you for coming to the clinic today. So how you are feeling now?"…….*

▶ Tell --

▶ Help & Explain (Body of skill)

- *"Ok. How are you getting with the tablets? I can understand that it is difficult for the people with the tuberculosis to take the medications early in the mornings and also they are not very pleasant."*
- *"Are you experiencing any side effects? I can understand that there are side effects also and some people refrain and stop taking the medication."*

Q: Do you mean that I am not taking the tablets?

- *"I can understand that and appreciate your concerns for the medication that you are taking but your lack of improvement is causing concerns to us and team is worried that whether you are taking the medications."*

Q: Why are you accusing me of not taking my tablets? Do you have any proof?

- *"But the GP has told the TB health visitor that you have not picked up your prescriptions except for the 02 months before."*

Q: Why are you suddenly so concerned about me? I know what is best for me.

- *"The treatment will make you better and you will also avoid spreading the TB to others."*

Q: Do you have any difficulty in taking the medications?

- *"If you have difficulty in taking the medications regularly or if you forget to take medications or you feel that it is complicated regimen then you can also follow the DOT scheme."*
- *"The advantage of DOT scheme is that it has to be taken only thrice weekly, but it can be altered according to how you are doing. You also do not need to remember to go to the GP or chemist to get the prescription."*
- *"As your symptoms have not improved, a decision regarding your treatment has to be made now. You will be placed on enforced DOT scheme so that you can be watched taking your medication."*

Q: What about my job? Would it affect it?

- *"Will you tell me that how important is working for you in the night club? ..... Ok. I can book your appointment with occupational health department and they can give you more options for it because it is important for you that if you will work there you will spread the disease to the others and it is for their safety as well as your safety."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"I will be in touch with you again soon in the clinic."*

22. MDR TB

Your role:	You are the doctor working with the respiratory team
Problem:	Discussing issue of MDR TB
Patient:	Mr Roshan Gujar, 44 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

A patient diagnosed with TB 5 months ago and was started on standard ATT. He is non-compliant with ATT because of unwanted effects and lack of improvement in his condition. His symptoms have worsened over the last 2 months. He has been admitted about a week ago as he was unable to eat or drink. His sputum samples have showed that he has multi drug-resistant TB. He is too unwell to be discharged and consultant feels that he should be kept admitted till established on new treatment with clinical improvement. The patient is in a side-room in an isolation ward for the last one week and is unaware about the details regarding MDR TB. He is unhappy there and wants to discuss about this as well as his other concerns and visiting restrictions imposed over her family as he is missing his children.

Your task: to discuss with the patient about his TB treatment and respond to his questions about the infection control policies in the ward.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the lung ward. Are you Mr __________? Well, nice to meet you sir."*
- *"Well, I understand that you were having tuberculosis and you were given treatment for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your disease and the ward sister has told me that you want to discuss with me few things. So, I hope I will be able to help you. Is that Ok? Before I proceed further, will you tell me that how you are feeling now?"*

▶ Tell

- *"Ok. What do you know about your diagnosis of tuberculosis and will you tell me that how you are getting on with the medications?"*
- *"Well, your tests for the phlegm which were done are showing that your tuberculosis is still active and unfortunately it appears that you are having drug resistant tuberculosis. This is the likely reason that your symptoms have not resolved yet. Drug resistant tuberculosis could be acquired due to poor compliance, previous treatment failure or acquisition of tuberculosis in a country with a high prevalence."*

▶ Help & Explain (Body of skill)

- *"My consultant is waiting for the results of more tests to come back but we may start you with some different medications through your blood channels that will work against drug resistant tuberculosis."*

Q: I am seriously thinking about packing my bags and going home.

- *"You don't have to stay in the hospital for the whole duration of treatment except initially till you are non-infectious, and your phlegm becomes negative or your symptoms improve. You will be monitored closely while being on new treatment and likely will get directly observed treatment."*

Q: Why I have been kept in this side room for so long?

- *"Ok. I can understand and appreciate your concerns that it is difficult to be in side room without being in contact with others or day to day activities of the ward. But as you are having drug resistant tuberculosis, we are concerned that other patients in the ward and staff on the duty must be protected from picking up of infection from you."*
- *"The other benefit of not keeping you there is that if you will be in the ward, there is a concern that you can pick up infection, because your defence system is weak due to tuberculosis and that is not good for you. Due to the same reasons, your relatives are asked to wear the mask so that they don't pick up the infection from you."*

Q: I am getting really upset as I am unable to see my children?

- *"Children are restricted because children have immature defence system and they can pick up infection very quickly. So that's why they are restricted."*
- *"Is there any other thing due to which you are unhappy for the isolation like the food is not proper, the nurses are not coming to much, no one is giving you proper care? ...... Ok. I will raise the matter further and get back to you after some time."*

Q: How long will I have to stay in here for?

- *"I assure you that we are working hard to help you improve and recover enough to go home."*

▶ Referrals/Leaflets & societies

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"I will be in touch with you again soon."*

- Hospital admission for every drug-sensitive or drug-resistant TB is not required, unless clinically or social needed.
- If isolation is required, discuss with infection control team about possibility of strictly controlled short visits.
- Contain smear positive patients (open/infectious TB) in a negative-pressure side-room until completion of 2 weeks of standard ATT. If going to be in contact with HIV-positive or other immunosuppressed patients, there should additionally be three negative sputum smears, tolerance to treatment and cough resolution (NICE guidelines).

NICE recommendations for barrier nursing

- **For drug-sensitive TB patients on treatment:** barrier nursing, use of masks, gloves not recommended, unless administering aerosol products or coming into contact with sputum or other body fluids.
- **For MDR-TB patients:** Wear an FFP3 face mask. Hospital admission in a negative-pressure side-room, until non-infectious and cultures negative.

Types of drug resistant TB

- **Drug-resistant TB:** resistance to one of drugs used in standard regime (INH, rifampicin, pyrazinamide, ethambutol or streptomycin).
- **Multidrug-resistant TB (MDR-TB):** resistance to at least isoniazid and rifampicin and possibly other agents as well.
- **Extensively drug-resistant TB (XDR-TB):** MDR-TB additionally resistance to any fluoroquinolone and to at least one of three injectable second-line drugs (capreomycin, amikacin and kanamycin).

23. Hospital superbug (Clostridium difficile)

Your role:	You are the doctor in the medical ward
Problem:	Discussing hospital acquired clostridium difficile diarrhea
Patient:	Mrs. Jasmin, 80 years old
Relative:	Mr. Munib Ayub, the son of Mrs. Jasmin

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This elderly lady was admitted 10 days ago after a fall. She was found to have UTI, and was given antibiotics according to urine microscopy, culture and sensitivities (MC&S). She has developed diarrhoea since yesterday and stool cultures have been sent for Clostridium difficile toxin, but the results are awaited. She is otherwise well, and plan is to discharge her once diarrhoea settles. She has been moved to side room due to diarrhoea. Her son has come to see his mother, expecting to take her home, but found her in side room. The ward sister has explained him about the situation, but he is concerned about shifting of his mother into side-room and contracting the diarrhoea because of poor hygiene in the hospital. He insists to speak to the doctor. He also got some idea after speaking to other patients' relatives that there has been an outbreak of diarrhoea in the hospital.

Your task: to address his concerns about his mother infection and isolation.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the medical ward. Are you Mr______, the son of Mrs. ________? Ok"*

▶ Agenda setting

- *"Well, the nurse in charge has told me that you are asking about your mother's condition and you have some concerns about her health. Is that correct? ......"*
- *"Do you want me to tell about your mother's condition?"*

▶ Tell

- *"Initially your mother was admitted with infection of the water and for that she was treated for the 5 days. It was according to the test on the water to which your mother was sensitive and that drug was given."*
- *"I acknowledge that since yesterday she has developed few episodes of loose motions or diarrhoea. We have sent the sample for the stools, but the results are awaited."*
- *"Whatever are the stool culture results, hospital takes all cases of diarrhoea seriously. In case it is due to a bug, precautions have to be taken to avoid spread of infection to the others.... Do you want me tell to more about it?"*

▶ Help & Explain (Body of skill)

Q: Why have you moved my mother to a side-room?

- *"Your mother is moved to side room and visitors are advised to wear an apron and gloves to avoid picking of that bug or transmitting it to others."*

Q: Is it true that there has been an outbreak of diarrhoea in the hospital and my mother problem is caused by the staff not taking care of adequate hygiene measures?

- *"I appreciate your concerns regarding outbreak of diarrhoea in the hospital…… Have you witnessed any specific situation where you felt that there is inadequate hygiene practiced in the hospital like a member of staff not cleaning hands in between patients or use of unclean equipment or incomplete commode cleaning or entry to dirty patient areas? …… "*
- *"Ok, I have noted down this specific thing and I will speak to the ward manager about it and get back to you. But, many patients in the hospital can have diarrhoea for a variety of reasons. However, if there is any suspicion of an outbreak, the infection control team take it seriously. This team take all precautions, report it to higher authorities and take prescribing measures to reduce the risk of spread by closing off certain wards or bays."*

Q: I have read about a 'hospital superbug' which can be serious and can even cause death. I am worried that my mother may have contracted this.

- *"I acknowledge and appreciate your concerns. This is one of the concerns that our team is having and that's why your mother stool has been sent to the lab to be investigated for this bug called Clostridium difficile."*
- *"If her diarrhoea is confirmed to be due to this bug, she will be given the correct treatment for this. She will also be monitored closely for any complications with daily examinations, X-rays of her tummy or blood tests if needed. You will also be kept informed about her progress."*
- *"Clostridium difficile is a type of bug that cause diarrhoea when patients gut defence mechanisms are disturbed by some factors like antibiotic treatment."*
- *"In most people, it is completely treatable with specific antibiotics and very rarely it can cause complications like severe inflammation of the bowel and obstruction."*
- *The old patients, the hospitalized patients and patients with other diseases are more susceptible to this bug."*

Q: Did the antibiotic given to her for the water infection may have caused this infection?

- *"It is a possibility but when she was initially admitted, she was sick with infection of water and treatment was absolutely indicated. She was given the correct antibiotics (according to the drug sensitivity profile) in her best interest and for the minimum duration required to clear the infection."*

Q: I am concerned about ABC staff members' hygiene practice /the cleanliness of the ward?

- *"Your concerns will be taken very seriously, and I will ensure it as I am going to talk to infection control team and ward manager".*
- *"I am going to speak to Mr_______ the member of infection control committee, and Mr________ the ward manager."*
- *"You are going to listen from any one of them in next 48 hours and if you do not, you can contact the ward manager and ask for an update."*

Q: I am not happy with your explanation.

- *"Ok. If you are not happy then I am giving you the contact details of the Patient Advisory Liaison Service (PALS) or complaints department of my hospital."*
- *"All patients and their relatives have rights to voice their opinion if they feel their medical care has been suboptimal."*

▶ Referrals —

▶ Reassure —

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far." **(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall —

Clinical features:

- C. diff infection can range clinically from asymptomatic colonization to diarrhoea and mild abdominal discomfort to pseudomembranous colitis to toxic megacolon in the most severe cases.

Management:

- Stop causative antibiotic, if possible
- General supportive measures.
- Oral metronidazole or vancomycin for 10–14 days (but C. diff toxin in stool cultures will remain positive for up to 6 weeks post-treatment)

Department of Health & Health Protection Agency joint guidelines (2008)

- Comprehensive antibiotic guidelines in Trust/hospitals to encourage use of narrow-spectrum antibiotics; reviewed by doctors, nurses and ward pharmacists on daily basis.
- Antibacterial management team comprising a microbiology or infectious diseases consultant and an antibiotic pharmacist to support ward staff.
- Cleanliness priority in all clinical areas with regular audit and feedback.
- High index of suspicion for potentially infectious diarrhoea
- Isolate suspected or proven cases.
- Wear gloves and aprons during contact with the patient. Wash hands with soap and water before and after patient contact.
- Monitor patient's diarrhoea using Bristol Stool Chart.

24. Hospital superbug (MRSA)

Your role:	You are the doctor in the medical ward
Problem:	Discussing MRSA infection in leg ulcers in a patient requiring nursing home care
Patient:	Mrs. Ghulam Zahra, 90 years old
Visitor:	Miss Bilqees Bano, one of senior carers at a local nursing home

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate/visitor.

Scenario:

This elderly lady was admitted 4 months ago after a fall at home. She has heart failure and bilateral chronic leg ulcers for the last few years. She cannot take her proper care at home and needs some assistance for mobilising, feeding, toileting and for the ulcer dressings. So, application to the nursing home was made. MRSA has also been detected in her leg ulcers 2 weeks ago, without any systematic effects. There was a place available in the local nursing home, and one of the senior carer of nursing home has come to assess the patient. Once told about MRSA, she is a little bit concerned about its impact on her staff and other patients residing there; possible difficulty in treatment and risk of overwhelming infection.

Your task: to talk to senior home carer about the overall condition of the patient, to tell her about MRS.A in her leg ulcers and address her concerns regarding this infection.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the medical ward. Are you Miss ______ from the local nursing home? Well, nice to meet you madam."*
- *"Well, I understand that you have come to assess the condition of Mrs. ____________. Is that correct?"*

▶ Agenda setting

- *"Do you want me to tell you something about her?"*

▶ Tell

- *"She is admitted in the ward for the last 4 months after a fall at home. She is having leg ulcers for many years and some heart failure; needs help with mobilizing, feeding, toileting and for the ulcers."*
- *"MRSA has been isolated from one of her ulcers, but this is not causing any problems either locally or systemically."*

▶ Help & Explain (Body of skill)

Q: What is MRSA?

- *"Methicillin-resistant Staphylococcus aureus (MRSA) is a form of bug called Staphylococcus aureus. It lives harmlessly on 1/3rd of population's skin or in the nose and does not cause any infection. In 1/10th of these carriers (3% of the population), this bug is MRSA."*

Q: What problems can it cause?

- *"It does not usually cause any problem. But if it causes infection, it is usually trivial infecting skin cuts or causing boils which are easily treated. Hospitalised patients may have serious infections in deep wounds, catheters or drips which allow the bacterium to enter the body causing septicaemia or pneumonia. People with weak defence system of body like HIV infection, are also vulnerable."*

Q: Why MRSA is so different from some other bacteria with regard to resistance to antibiotics?

- *"MRSA behaves in exactly the same way as staphylococcus aureus and causes the same range of infections. The only difference is resistance to antibiotics, that's why its spread in the hospitals is a cause of concern and such patients need to be isolated in side-rooms or special wards."*

Q: How residents with MRSA should be cared for?

- *"Encourage them to live a normal life without restriction, and there is:*
    - No risk to other residents, staff, visitors or members of their family, if good basic hygiene precautions are taken.
    - No need for isolation.
    - No problem in room sharing unless neither of them have any open sores or wounds, drips or catheters.
    - No problem in joining other residents in communal areas (like sitting & dining rooms), if sores or wounds are covered with an appropriate dressing which is regularly changed.
    - No problem in receiving visitors and going out of the home to see their family or friends."
- *"Help them for hand washing if unable to do so by themselves."*
- *"Wear disposable gloves and aprons while attending for dressings, performing aseptic techniques or dealing with blood and body fluids."*
- *"Cover cuts, sores and wounds in staff and residents with impermeable dressings."*
- *"Deal with blood and body fluid spills immediately according to the locally agreed policy. Dispose of sharps into proper sharps containers."*
- *"Clean equipment thoroughly with detergent and hot water after use (like commodes)."*
- *"Wash clothes and bedding in machine, in accordance with the local policy."*
- *"Deal with cutlery, crockery and clinical waste in the normal way."*

Q: What precautions do we have to take in the nursing home for her, especially regarding basic hygiene for MRSA cases?

- *"Staff with eczema or psoriasis should not attend such residents."*
- *"Attend at the end for any procedure after other residents have been attended."*
- *"Do procedures or dressings in their own room."*
- *"Seek and follow expert infection control advice from the consultant in communicable disease control and/or community infection control nurse for any resident with MRSA who has a post-operative wound or a drip or catheter."*

Q: Whether staff or other patients need screening?

- *"Routine screening for MRSA is not required unless there is a clinical reason, for example a wound getting worse or new sores appearing. In such cases, the resident's GP should send wound swabs to the local hospital for general microbiological investigations. Screening of other residents and staff is very rarely necessary and would only be done following discussion between the consultant in communicable disease control and the microbiologist."*

Q: What if a resident with MRSA needs hospital admission?

- *"Inform the hospital beforehand. Contact hospital's infection control doctor or infection control nurse if the person is to receive inpatient treatment. They are available through the hospital switchboard and are usually based in the Department of Medical Microbiology. Relevant department should be informed if the person is to receive outpatient treatment."*

Q: What if an MRSA infection is diagnosed in other resident?

- *"This is uncommon outside hospitals. However, if a resident does become infected with MRSA, their GP should contact the microbiologist at the local hospital for advice on treatment. Meanwhile, any infected wounds or skin lesions should be covered with appropriate dressings."*
- *"For more information we need to talk to consultant in communicable disease control (CCDC) & community infection control nurse (CICN)."*

Q: If I say that we can't entertain such patients, then?

- *"I appreciate your concerns but there can be no justification for discriminating against people who have MRSA by refusing admission to a nursing or residential home or by treating them differently."*

▶ Referrals —

▶ Reassure —

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall —

25. Assessing suicide risk (Paracetamol poisoning)

Your role:	You are the doctor in the emergency admissions unit
Problem:	Assessing suicide risk
Patient:	Mr Waqas Anwar, 45 years old information technology consultant

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient was admitted today with paracetamol overdose. He took 10 tablets of paracetamol 500mg each with two glasses of vodka 24 hours ago to commit suicide. His paracetamol levels are under the treatment level and symptoms are not suggestive of hepatotoxicity. He is sitting alone in day room watching TV. The ward nurse is worried that it could be a genuine suicide attempt. She wants you to assess him.

Your task: to explore the reasons behind his suicide attempt and assess him for suicide risk.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the emergency ward. Are you Mr __________?"*
- *"Well, I understand that you were admitted with tablet overdose and I am feeling very sorry that you are in the hospital and you attempted to kill yourself."*

▶ Agenda setting

Q: You wouldn't understand how I'm feeling at the moment, my life is not worth living any more.

- *"I am here to help you. Whatever help you want I will take care of you and I will look after you. Before I proceed further, will you tell me that how you are feeling now? ……. Are you feeling sick (nausea), have tummy pain or headaches (from the paracetamol poisoning)."*

▶ Tell —

▶ Help & Explain (Body of skill)

- *"Would you like to tell me how you attempted to kill yourself? …. Which tablets you took? And how many? Did you take all at once? Have you taken with alcohol? How many hours ago? Was it a planned suicide attempt? Were you alone at that time, and was it timed so that no one could intervene? Did you write any suicidal note? Have you changed your mind now? Did you inform anybody after suicidal attempt? Do you still want to die?"* ***(History of self-harm)***
- *"I can understand there will be some problem in your life because of that you attempted suicide. Do you want to share with me? … Do you have any problem at work?* ***(Job loss)*** *Any marital problem? Any financial or legal issues? Issues regarding drinking or drug addiction? Any mental illnesses? Are you socially isolated?"* ***(Reasons for self-harm)***
- *"I would like to ask you few more questions regarding your present health. Is that ok? Do you have any suicidal thoughts? Any past history of psychiatric disorders? Do you have any feeling of hopelessness, worthlessness and despair; or low mood with poor sleep, poor appetite and poor concentration? Any believe of being threatened, mistreated, or will be harmed in the future?* ***(persecutory delusion)*** *Any feeling that people are 'out to get you?* ***(paranoia)*** *Do you hear something which other people don't hear?* ***(auditory hallucinations)*** ***(Mental state assessment)***
- *"Do you have any past history of psychiatric illness or suicidal attempts?"*

- *"Who else is there at home to look after you? Who visits you; relatives, neighbours, GP or nurse?"* ***(social support)***

Q: How can you help me sort my life out?

- *"Ok, you need help, and I am here to help you. Are you aware why you need help? (insight) I will look after you medically for any tummy pain, feeling sick or being sick. I will also arrange regular blood tests (LFTs) as you get over the paracetamol poisoning. I will book your appointment with the mind specialist /psychiatrist as well who may consider transferring you to the psychiatric unit to start antidepressant therapy and to protect you from any further self-harm. How do you feel about seeing a psychiatrist?"*
- *"Do you have any concern that have not been addressed ...... ok"*

▶ Referrals

- *"I am going to book your urgent appointment with mind specialist under mental health act as it seems that you have underlying have psychiatrist disorder."*

(If patient does not have evidence that he is mentally disordered then check the capacity for psychiatric consult)

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

Factors suggesting genuine suicidal attempt:

- Extensive premeditation
- Precautions taken to avoid discovery
- Act carried out in isolation
- Act timed so intervention unlikely
- Preparation made for the attempt (e.g. saving up tablets)
- Preparation made in anticipation of death (e.g. making a will)
- Leaving a suicide note
- Failing to inform potential helpers after the failed attempt
- Admission of suicidal intent

Assess following an attempted suicide:

- Events that preceded the act
- Reasons for the act
- Problems faced by the patient
- Any psychiatric disorders / history including previous suicide attempts
- Family and personal history
- The risk of suicide
- Availability of coping resources and support
- Patient willingness to accept help

Factors associated with risk of further suicidal attempts:

- Male
- < 19 or > 45 years old
- Unemployment
- Separated, widowed, divorced, living alone
- Problems with alcohol and drugs
- Chronic physical health
- Previous attempt with hospital admission
- Psychiatric disorder (esp. depression, schizophrenia, alcoholism)

Remember:

- Patients attempting suicide are at high-risk for self-harm if discharged being uncooperative with medical treatment or attempting self-discharge. Such patients if suffering from a mental disorder, there may be grounds for treating them under the Mental Health Act, and therefore seek urgent psychiatric opinion. If no evidence of mental disorder, assess patient's capacity to make decisions.

Assess capacity: Determine whether the patient is able to

- Comprehend and retain information on the proposed treatment (indications, benefits and consequences of non-treatment)
- Believe the information
- Use the information and weigh it to arrive at a decision.

26. Genetic counselling

Your role:	You are the doctor in the neurology clinic
Problem:	Genetic counseling for Huntington's disease
Patient:	Miss Javairia Ansari, 25 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This lady has come to see you in clinic with her father who has been diagnosed recently with Huntington's disease. There is no family history although this may well be concealed. Although, she herself is fit and well but she wants to speak to you privately to know that whether a genetic blood test should be done or not, to determine whether she is at risk of developing this disease in future. She herself is unmarried yet but wants to know the possibility of passing this disease to her future children.

Your task: to obtain her reasons for a genetic test and counsel her for this.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the brain clinic. Are you Miss __________?"*
- *"Well, I understand that you have visited the clinic with your father who has been recently diagnosed with Huntington's disease. Is that correct?"*

▶ Agenda setting

- *"Well, as you desire, I am here to discuss with you privately about your risk for developing this condition and what we can do further. Is that Ok?"*
- *"Do you have a partner? ... As it is best that your partner should be present during the discussion."*

▶ Tell —

▶ Help & Explain (Body of skill)

- *"How many sisters, brothers, aunts, uncles and cousins you have? Is there anyone else in your family who is already affected with Huntington's disease?"* ***(family tree)***
- *"So what do you know about Huntington's disease or you want me to tell about it? ......"*

Q: How it is caused?

- *"It is caused by a faulty gene (Huntington gene). This gene normally has a section called a CAG repeat which looks like this: CAGCAGCAGCAGCAGCAGCAG... But in Huntington's disease, the number of CAG repeats is expanded beyond 35 repeats (36-100). This faulty gene produces abnormal protein which is toxic to some parts of the brain (basal ganglia) causing gradual loss of brain cells with loss of function over time."*

Q: What are the symptoms of this condition? (Symptoms)

- *"The symptoms start at 30 - 50 years and include **movement disorders** (stumbling & clumsiness while walking, involuntary jerking or fidgety movements of limbs & body, problems with swallowing or speaking or breathing); **difficulty concentrating & memory lapses; depression, mood swings and personality changes.** Full-time nursing care is needed in the later stages of the condition."*

Q: Can this disease be prevented from developing? (Treatment)

- *"There's currently no cure or way to stop it getting worse. Treatment and support can only help to reduce some of the problems it causes:*
    - Medicines for depression, mood swings and involuntary movements
    - Occupational therapy and changes to make everyday tasks easier:
    - Putting in ramps for a wheelchair, fitting a stair lift, installing grab rails by the stairs or beside the bed
    - Using electric can openers, electric toothbrushes and kitchen utensils with large handles
    - Voice-controlled lights or software on a computer
    - Physiotherapy to help with movement and balance
    - Speech & language therapy for communication problems
    - Alternative ways of communication – electronic speech devices or picture charts
    - Dietary advise from dietitian for feeding problems
    - High-calorie diet to prevent weight loss
    - Ways to make food easier to chew and swallow
    - Placement of feeding tube that goes directly into stomach"

"Research is underway to find new treatments for slowing down or halting the condition by "switching off" the faulty gene that causes it. Several treatments are now going through clinical trials. If they're found to be safe and effective, they might be available in several years' time.

Q: Does this mean I might go insane and behave as my father did? (Prognosis)

- *"I appreciate your concerns. This disease gradually worsens over time. I feel very sorry to say that, it is usually fatal 15 to 20 years after the symptoms start…."*

Q: Are you sure the disease my father has runs in the family? We are not aware of my grandparents, uncles, aunts or cousins being affected.

- *"Yes, this disease runs in families and is passed on (inherited) from parents to children. Occasionally, there is no family history, which is usually because one of the parents was never diagnosed with it."*

Q: What is the risk that my brother will have it? And any children I may have in the future? (Inheritance)

- *"If a parent has Huntington's disease, the chance of developing it is 1 in 2 (50%), while chance of never developing is also 1 in 2 (50%). The affected babies can also pass the gene to their children. Both men and women can get it."*

Q: Is there any test to show which of us will develop this disease?

- *"Genetic screening is done to ascertain the genetic make-up for any genetic alteration (mutation) linked with this illness **(mutation of distal short arm of chromosome 4)** for identification of high risk of developing the condition."*
- *"Why you want the test? … Are you voluntarily choosing to be tested, or someone else is coercing you from your family, friends, partner, potential partner, physician, insurance companies, or employer?"*

Q: How the test is done?

- *"It is a blood test to look at the genetic make-up. A small sample of blood is drawn. Two separate blood samples will be taken (to double check the results). Your affected parent's blood may also be tested to check diagnosis of disease which could create a problem for you to have their consent. The DNA extracted from blood is analysed in a specialized laboratory. In prenatal testing, DNA samples are obtained from the foetus by chorionic villus sampling or amniocentesis. The results are ready after 4-6 weeks."*

Note: Neither the counselling centre nor the test laboratory should establish direct contact with a relative whose DNA may be needed for the purpose of the test without the permission of the patient. It may be invasion of the privacy.

- *"It is preferable that you should select a companion to accompany you throughout all stages of the testing process (pre-test stage, taking of the test, delivery of results, post-test stage). This companion may be your spouse/partner, a friend, a social worker or any individual whom you have the confidence. It may not be appropriate for the companion to be another at-risk person."*
- *"You can withdraw from the testing process at any time."*
- *"Legal ownership of result remains with the individual who requested the test."*
- *"You have the right to decide, prior to the date fixed for the delivery of the result, if you do not want to be told."*

- *"The result of the test will be revealed in person by the counsellor to you and your companion. The result shall not be revealed by telephone or by mail or email."*

Q: How accurate is this test?

- *"There is a possibility of false-positive and false-negative results, because of the possibility of human or technical error that is unavoidable in laboratory procedures. However, a positive or negative result is 98-99% accurate. In a few cases, the test result is not clear, and a definite answer is not possible (un-informative result)."*

Q: Can I find out when I will get the disease if I have a positive test?

- *"I appreciate your concerns. The counsellor will explain that, although the gene defect has been found, at the present time no useful information can be given about age at onset or about the kind of symptoms, their severity or the rate of progression."*

Q: Are there any significant medical, social or financial implications of screening?

- *"If you get a positive test, there could be difficulties with confidentiality, genetic discrimination in employment or insurance coverage, and impact on family dynamics or personal relationships."*
- *"You can have emotional impact on you and your family."*
- *"It can also affect your job opportunities, such as the armed forces, it may be an obstacle to recruitment."*
- *"You may find problem in finding life insurance at standard premium, and likely have to pay higher premiums than others. Some insurers may decline your application for Life Insurance. If you don't tell your insurers about having Huntington's, your insurance could be invalid."*
- *"If it is difficult to manage your financial or legal affairs you can appoint someone as Lasting Power of Attorney (LPA) for Property and Financial Affairs, and for Health and Welfare."*

Q: What could be the implications, if I decide not to be tested, as I am scared what will happen after it?

- *"As many as 90 % of individuals who have a parent with HD choose not to take a gene test that reveals if they will also develop the fatal disorder. If a person has already lived a certain number of years without developing symptoms, then chances are relatively less to have the defective gene."*

Q: What if I want to have a child that won't inherit HD? Can my children be tested?

- *"If you wish to have children in future, several reproductive options are available*
  - **Pre-implantation genetic testing:** egg fertilization in laboratory, and genetic testing before implantation into the womb
  - **Prenatal testing:** chorionic villus sampling or amniocentesis
  - **Child with a donor egg or sperm** (un-Islamic in Muslim countries)
  - Adoption
- *"I feel sorry to say that, according to the law, the test is available only to those who are over 18 years, has made a decision voluntarily without being affected by the pressure from parents, partners, and other family members."*

Q: What are the important preliminary steps before genetic testing?

- *"Your appointment will be booked by your GP to Regional Genetics Clinics. You will have:*
  - Verification of disease in a family member
  - Neurological examination and psychological appraisal.
  - Counselling session in genetics clinic (at least three) to discuss concerns and implications of testing."

Q: Can I have the test now?

- *"The decision for genetic test to be performed can take a minimum of 1 month once the counsellor from genetics clinic has ascertained that the pre-test information has been properly understood. The contact will only be maintained at your request."*

Q: Is the result of genetic test confidential?

- *"Information obtained through genetic testing is strictly confidential. The test results cannot be disclosed to anyone other than the individual who was tested, unless the individual gives his/ her written consent."*

- *"I will also like to discuss that genetic testing may show that putative parent is not the biological parent. With the availability of techniques such as in vitro fertilization, etc., even cases of non-maternity may occasionally be discovered."*
- *"Do you have any concern that have not been addressed?"*
- *"You can also get good information from Huntington's Disease Association."*

▶ Referrals

- *"I can book your appointment with regional genetic centre if you decide to go ahead with the testing."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"Take time to think if you are not sure about your decision."*
- *"Well, I can arrange a next appointment, I will provide you with addresses of appropriate support services as well."*

- The counsellors should be specifically trained in counselling methods and form part of a multidisciplinary team.
- Multidisciplinary teams should consist of a geneticist, a neurologist, a social worker, a psychiatrist and someone trained in medical ethics.
- The counselling unit should plan, with the patient, a follow-up protocol that provides support during the pre- and post-test stages regardless of whether the patient chooses a companion.

27. Fitness for anaesthesia /surgery

Your role:	You are the doctor in the general medical clinic
Problem:	Medical assessment in COPD and heart failure patient before surgery
Patient:	Mr Taimoor Wajid, 80 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This elderly man, known to have heart failure and COPD, is under the treatment of urologist for BPH. His symptoms of prostatism has worsened and require TURP. He is breathless while walking upstairs and has not managed to get out of his flat for last 01 year. He has been referred by urologist to medical outpatient for medical opinion regarding fitness for anesthesia. He is currently on aspirin, diuretic, bronchodilator inhalers and ACEI.

Your task: to give a medical opinion to the urologist.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the medical clinic. Are you Mr. _________? Well, nice to meet you sir."*
- *"Well, I understand that you are being worked up for operation of your waterworks, but you were also having 'smoker's lung disease' (COPD) and heart failure, and you are on some treatment for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to assess the severity of your smoker's lung disease and heart failure, and to give the medical opinion regarding your diseases which will help the anaesthetist to know your fitness whether it's safe for you to undergo surgery/anaesthesia or not. Is that Ok? Before I proceed further, will you tell me how you are feeling now?"*

▶ Tell —

▶ Help & Explain (Body of skill)

- *"I would like to ask little bit detail to assess your current condition. Is that ok? Do you have any breathlessness on walking or even at rest? How much distance can you walk on flat at normal pace before stopping ...? And before the illness? How many flight of stairs can you walk up before stopping ...? And before the illness? Are you short of breath while doing activity of daily living? Are you short of breath while lying flat? How many pillows you use under your head at night to sleep? Do you wake up at night due to breathlessness? ..... Do you have any chest pain? Any swelling of feet? ..... Do you have any other diseases like DM or weakness of any part of the body?"* ***(Symptoms of HF & COPD + other medical problems)***
- *"I am going to ask you a little bit more about your past medical history. Have you ever undergone any surgical operation? Was it performed under general, local or spinal anaesthesia?"*
- *"How many medications or inhalers are you taking at home for your diseases? Are you taking them regularly? How often do you require nebulizer machine at home?"* ***(Medications)***
- *"Are you on home oxygen therapy?"* ***(LTOT)***
- *"Have you quit smoking?"*
- *"Had you any anaesthetic complications during these operations like any allergies to medications or anaesthetics?"*

(It is the anaesthetist who would ascertain the state of the teeth and any possible indications of difficult intubation, e.g. short immobile neck, malpositioning of teeth, high-arched palate, receding mandible, and poor mouth opening).

- *"I would like to arrange a list of investigations which would be useful for the urologist and the anaesthetist (like CBC, RFTs, glucose, resting ECG, oxygen saturations on air, spirometry, chest X-ray)."*
- *"Do you have any concern that have not been addressed ...... ok"*

Q: Am I fit for the anaesthetic, doctor?

- *"I am not the right person to judge that at my own whether you are fit for an anaesthetic. This is the responsibility of the anaesthetist. I am a physician and my job is to give a medical opinion i.e. how bad or good is your COPD and heart failure. I can assess the status of heart and lungs and arrange relevant investigations, all of which will help the anaesthetist to make the final decision."*

▶ Referrals

▶ Reassure

- *"I will discuss your case with the consultant as well. I am also going to write back to urologist about the medical opinion, and results of your investigations will follow it."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"I will be in touch with you soon to discuss the results of tests."*

- Physicians are commonly asked for anaesthetic opinion from surgeons. Remember, you are a physician and not an expert in anaesthesia. So, you should only give medical opinion and relay the results of investigations to the surgeons. If results of investigations are not available same day, let the surgeon know that the results are to follow.

28. Screening for prostate cancer

Your role:	You are the doctor in the general medical clinic
Problem:	Screening for prostate cancer
Patient:	Mr. Azmat Bashir, 65 years old retired electrician

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient attends the clinic for management of hypertension. His BP in the clinic today is slightly high, but recently his BP has been reasonably well controlled with amlodipine, ramipril and doxazosin. He is scared about prostatic cancer as heard from media. He read in a newspaper about a magical blood test that detects prostate cancer instantly (PSA). He does not have symptoms of prostatism. He wants to discuss with you about this test whether he should go for it or not.

Your task: to discuss with the patient, the pros and cons of screening for prostate cancer.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctors in the medical clinic. Are you Mr _________? Well, nice to meet you sir."*

▶ Agenda setting

- *"Well, I understand that we are here today to discuss the test which you want to have. Is that correct? So, before we proceed further, would you tell me how are you feeling now?"*

▶ Tell --

▶ Help & Explain (Body of skill)

- *"Do you have any prostatic symptoms like poor flow at the start, poor stream, dribbling of waters after passing it? (post-micturition dribbling) Do you woke up at night more frequently than normal to pass waters? (nocturia) Any stinging (dysuria) or blood in it (haematuria)?"*
- *"What do you know about prostatic cancer?"*
- *"Could I ask the reason why you want to be screened for prostatic cancer? .... Are you worried that you might have this problem? ...... or any family history? .... or any pressure from anyone? ......"*

Q: I just read about it in the newspaper.

- *"Sir, will you tell me what have you read in the newspaper, and what are your worries? Will you share with me? ......"*

Q: Tell me what this gland is, and what is prostate cancer?

- *"Ok. Sir the prostate is a small gland found only in men. Its shape is like a walnut and size about a satsuma, but it grows larger as one get older. This gland sits in the pelvis underneath the bladder and surrounds the urethra, which is the tube men pee and ejaculate through. Its main job is to help make the semen, which is a thick white fluid that carries sperm produced by testicles."*
- *"Prostate cancer can develop when cells in the gland start to grow in an uncontrolled way. It is the most common cancer in men (1 in 8 men at some point in their lives). The risk of this cancer is increased if age 50 or over, Black (1 out of 4), father or brother has had this cancer (2.5 times increased risk)."*

Q: I am aware that this cancer is very common in men. Is that possible that one can be asymptomatic but still have the cancer?

- *"If the patient is not having the symptoms, as I asked you before, it is very less likely that he can have prostatic cancer. I agree with you that it is the most common cancer in men, but it is not one of the causes of largest number of cancer deaths in men. That is the lung cancer. Ok."*

Q: How will you investigate it?

- *"If the patient is having symptoms as I asked you before; or in the blood test ALP is raised, progressive back pain or sciatica, then it is reasonable that such patient should be screened for prostatic cancer."*
- *"There are three ways. One is that we will examine your back with a finger* ***(digital rectal examination)****, then we can do a blood test for prostatic specific antigen (PSA), and, if it is abnormal, then we can take piece from your gland (prostatic biopsy)."* **(silence)**
- *The decision to offer prostate cancer screening is made on an individual basis, depending on the patient's age, health status, family history, risk of prostate cancer and personal beliefs."*

Q: What will happen if I have the blood test and it comes back positive? Does that mean I have cancer?

- *"For screening to be effective, there are multiple factors which need to be considered. PSA test can be raised due to many other conditions as well, other than this cancer, like infection of waterworks, infection of the gland or some other reasons. Also, it is not uncommon to have false-positive results. If the patient have false positive result, then unnecessarily he may undergo through a surgical procedure called prostatic biopsy. Do you want me to tell about prostatic biopsy? ...... A piece is taken from the gland, and this is called prostatic biopsy. It is also quite possible that the patient is having a cancer and test can be negative. So, screening tests are not 100% guaranteed to detect or dismiss the presence of cancer."*
- *"However, if we take a piece from your gland (prostatic biopsy), after you have abnormal blood test and/or abnormal examination of back with finger, and that piece shows that you have a cancer, then it means that the cancer is detected at an early stage, so the curative therapy can be undertaken." Many individuals with this incidental findings of cancer can undergo unnecessary treatment, when actually the cancer is so slow growing that without treatment it would not have affected the length of life. Treatment might also end up in incontinence and impotence.*
- *"Do you now want to have examination of your back with finger (digital rectal examination) or blood test for PSA (informed consent)?"*

Q: What treatments are available for this cancer?

- *"Different types of treatment are available. One is surgical, which is radical prostatectomy. We are also giving radiation which is called radiotherapy* ***(curative treatment for cancers confined to the gland)****. Some other treatments are also available there if the tumour size is small. These treatments will decrease the symptoms and improve the quality of life. Few other treatments are also available to relieve the symptoms* ***(Palliative treatments)*** *if cancer has spread to other sites called metastatic disease* ***(orchidectomy to eliminate androgen stimulation of the tumour)****.*

▶ Referrals —

▶ Reassure

- *"Your consent and your wishes will be appreciated and as you will say we will do.... Take time to think."*
- *"You can change your mind about a decision at any time."*
- *"You have a right to seek a second opinion as well."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"I will be in touch with you again soon in the clinic to discuss the result of tests."*

E. BREAKING BAD NEWS

- Malignancy in a young patient
- A chronic illness

29. Malignancy in a young patient

Your role:	You are the doctor in the chest clinic
Problem:	Explaining the diagnosis of Hodgkin's lymphoma
Patient:	Miss Nosheen Fatima, 25-year-old clerical officer

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient presented to his GP 6 weeks ago with fever and loss of appetite. After initial assessment, GP booked an appointment with the consultant. She was seen by your consultant 4 weeks ago in the clinic and her CXR revealed bilateral hilar lymphadenopathy. The consultant did not discuss the diagnostic possibilities with her, but his general demeanour appeared to be worrying after looking at CXR report. The consultant arranged for a mediastinal biopsy (mediastinoscopy) which was performed by the thoracic surgeons 10 days ago. She has come to know the results of the test, but your consultant is away today. She is concerned after talking to one of her friend, who is a nurse, that this may be a cancer. Unfortunately, the report shows Hodgkin's lymphoma.

Your task: to break the bad news about Hodgkin's lymphoma to the patient, address her concerns and answer her questions.

▶ Greeting

- *"Hello! I am Dr __________________, one of the doctor in chest clinic. Are you Miss _________? Well, nice to meet you madam."* ***(No good morning)***
- *"Well, I understand that you were having fever and loss of appetite, and some test was done on you (piece of gland from chest was taken by chest surgeon: LN biopsy). Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the results of your tests and what we can do further. Is that ok? So before I proceed further, will you tell me that, is this place, is this room quiet and comfortable, and whether can we carry out our discussion here? ..... Do you want any of your relative or the partner or the friend to be with you during this discussion? ...... Ok, will you tell me that how are you feeling now?"*

▶ Tell

- *"Ok, whether the consultant, at the first visit, has explained you about the possible diagnosis what you could have?"*
- *"Whether you have any thoughts about what might be causing your problem?"*

Q: I am frightened that it is cancer. So what does report say?

- *"Ok, I have the result of your test, and it is showing that you are having Hodgkin's lymphoma......"*
- *"Have you ever heard of Hodgkin's lymphoma? ...."*

Q: Is it a cancer?

- *"Yes, it's a type of cancer."* ***(Golden silence)***

▶ Help & Explain (Body of skill)

- *"I can understand this that this is a big shock for you, but there are doctors who specialise in this disease and well-established treatments are available."*

- *"Whether you want me to tell more about Hodgkin's lymphoma? .... "*

Q: Ok, doctor tell me more about Hodgkin's lymphoma.

- *It is an uncommon cancer that develops in the lymphatic system, which is a network of vessels and glands spread throughout the body. The lymphatic system is part of body's defence (immune) system). Clear fluid called lymph flows through the lymphatic vessels and contains infection-fighting white blood cells, known as lymphocytes. In Hodgkin lymphoma, a particular type of lymphocyte (B-lymphocyte) start to multiply in an abnormal way and begin to collect in certain parts of the lymphatic system, such as the glands (lymph nodes). The affected lymphocytes lose their infection-fighting properties, making more vulnerable to infection. The most common symptom of Hodgkin lymphoma is a painless swelling in a lymph node, usually in the neck, armpit or groin."*

Q: What causes it doctor? Why I have it? Is it inherited?

- *"It is caused by a change (mutation) in the DNA of a type of white blood cell called B lymphocytes, causing them to multiply uncontrollably. Although the exact reason why this happens isn't known. The abnormal lymphocytes usually begin to multiply in one or more lymph nodes in a particular area of the body, such as your neck or groin. Over time, it's possible for the abnormal lymphocytes to spread into other parts of your body, such as your bone marrow, spleen, liver, skin, lungs. There are many factors which can cause this disease like HIV infection, EBV infection and undetermined factors.*

Q: My aunt died of cancer when I was small, and my dad tells me that it was awful, she was in so much pain and the doctors didn't seem to be able to do anything to help her. Am I going through the same agony?

- *"It's a relatively aggressive cancer and can quickly spread through the body. Despite this, it's also one of the most easily treated types of cancer."*

Q: Will my younger brother will also have it?

- *"It is not infectious and is not thought to run in families. Although risk is increased if a first-degree relative (parent, sibling or child) has had lymphoma, it's not clear if this is because of an inherited genetic fault or lifestyle factors."*

Q: How far advanced is it?

- *"I will book your urgent appointment to the relevant consultant (haemato-oncologist). They will assess you by arranging a scan of your chest and abdomen (CT scan) to establish the extent of the disease and will then make a decision about the most appropriate treatment."*

Q: What treatment options are available for it?

- *"I don't know the finer details but there are treatments available like radiotherapy in which they are giving the patients the radiation, and chemotherapy in which medicines are given through the blood channels. Surgery isn't generally used as a treatment for the condition. But there are specialist available and I will book your early appointment with them and they will assess you and they will be in a better position to tell you what treatment you fits on, and what treatment they will offer."*
- *"Overall, around 85% of people with Hodgkin lymphoma live at least 5 years and most of these will be cured. However, there's a risk of long-term problems after treatment, including infertility and an increased risk of developing another type of cancer in the future."*
- *"Is there anyone in the home to support you? How you came here - by driving? ..... I will advise you not to drive home on her own. We can arrange an ambulance to drop you back ...... I will inform your GP for primary care support."*

▶ Referrals

- *"I will book your appointment with haemato-oncologist for further evaluation and treatment."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***

- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"This must be a great shock for you. You will need time for all this to sink in so I suggest we meet again in a few days so I can answer all your questions."*
- *"You can also talk to me on this contact number if you need further advice."*

30. A chronic illness

Your role:	You are the doctor in the clinic
Problem:	Explaining the diagnosis of multiple sclerosis
Patient:	Mrs. Tehmina Jamal, 45-year-old secretary

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient presented to the GP 2 months ago with blurred vision in left eye persisting for 4-days. She also had an episode of facial weakness 8 months ago from which she completely recovered. She was referred to consultant physician for her blurred vision 04 weeks ago, where she was found to have swollen optic discs. The consultant mentioned the possibility of multiple sclerosis (MS), but as her eye symptoms had resolved, she re-assured herself that she can't have MS. An MRI scan was performed 2 weeks ago, which revealed multiple demyelinating plaques in the brainstem and periventricular regions suggestive of MS. Knowing about this diagnosis could be catastrophic for her, as she is an active lady. She has come to the clinic to get her MRI result.

Your task: to explain the results of MRI scan, convey the diagnosis of MS, answers her questions and address her concerns.

▶ Greeting

- *"Hello! I am Dr ________________, one of the doctor in the clinic. Are you Mrs. _________? Well, nice to meet you madam.* ***(No good morning)***
- *"Well, I understand that you were having blurred vision in your left eye, and your scan was done (MRI). Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the results of your scan and what we can do further. Is that ok? So before I proceed further, will you tell me that, is this place, is this room quiet and comfortable, and whether can we carry out our discussion here? ..... Do you want any of your relative or the partner or the friend to be with you during this discussion? ...... Ok, will you tell me that how are you feeling now?"*

▶ Tell

- *"Ok, whether the consultant, at the last visit, has explained you about the possible cause of your problem?"*
- *"Whether you have any thoughts about what might be causing your problem?"*

Q: Tell me doctor, what's wrong with me?

- *"Ok, I have the result of your scan, and it is showing that you are having Multiple Sclerosis......"* ***(Golden silence)***
- *"How you feel about this news? ......Have you ever heard of Multiple sclerosis? ...."*

▶ Help & Explain (Body of skill)

Q: I have done some research on it and have come to know that this condition could manifest with some serious complications like difficulty in walking, incontinence and dementia. Is that correct doctor?

- *"I can understand that this is a big shock for you, but I re-assure you that not all the patients go on to develop this type of extreme end stage disease."*
- *"There are specialists who look after the patient with multiple sclerosis. They will help you with the best available treatment. "*

- *"Whether you want me to tell more about multiple sclerosis....... "*

Q: What is multiple sclerosis doctor?

- *"It is a lifelong condition that affect the brain and back. Symptoms include problems with vision; problem with arm or leg movement (difficulty in walking); muscle stiffness and spasms; numbness or tingling in different parts of the body; problems with balance and co-ordination; problems controlling the bladder and bowel; speech and swallowing difficulty; and problems with thinking, learning and planning."*
- *"Depending on the type of MS, the symptoms may come and go in phases or get steadily worse over time (progress). Two episodes must be there so that we can label it as multiple sclerosis. It can sometimes cause serious disability, although it can occasionally be mild."*
- *It's most common in 20s and 30s but can develop at any age. In the females it is more (3:1). 1 in 1000 can have it."*

Q: What causes it doctor? Will my children also get it?

- *"It is an autoimmune condition of the nervous tissue of the brain and back, where the immune system mistakenly attacks the protective layer of nerves (called myelin sheath) causing soreness. This condition affects the brain and back in patches. Soreness can disrupt the messages travelling along the nerves. When the soreness goes away, it can leave behind scarring of the myelin sheath (sclerosis). These attacks, particularly if frequent and repeated, can eventually lead to permanent damage to the underlying nerves."*
- *"We don't know what causes the immune system to attack the myelin sheath and what flares it, but it seems likely that it's partly caused by genes you inherit from your parents (2 - 3% chance among siblings) and partly by outside factors that may trigger the condition (lack of sunlight and vitamin D, smoking, teenage obesity, Epstein-Barr virus infection)."*

Q: What are my chances of leading a normal life?

- *"It is not possible to answer these questions but what I know that many patients with multiple sclerosis live very active lives for many years even after the diagnosis. Only 15% of patients experience the chronic progressive type of disease."*
- *"Patients with relapses and remission, as in your case, may go on for many years without any major disability."*

Q: Will I become 100% normal or will I have second episode again?

- *"It is not possible for me to predict your type, whether there will be recurrence or not, because nerves are damaged every time and every time nerves recover but they are not recovered with full power, so it is difficult for me to predict."*

Q: What about it in pregnancy?

- *"Relapse decreases in the pregnancy."*

Q: What treatment options are available for it? Will it go away?

- *"There's currently no cure for MS, but it's possible to treat the symptoms with medicines and other treatments as advised by a team of different healthcare professionals including brain specialist, a physiotherapist, a speech and language therapist, specialist MS nurse.*
    - **Treating relapses:** with steroid medicine either a 5-day course of steroid tablets taken at home or injections of steroid medicine given in hospital for 3 to 5 days
    - **Treating specific MS symptoms:** like fatigue, visual problems etc.
    - **Treatment to reduce the number of relapses** (disease-modifying therapies): Interferon
      Indications for interferon:
        - Age >18 years
        - Patient is able to walk 100 m independently
        - 2 severe attacks in last 2 years
        - It is to be avoided in pregnancy
- *"I don't know the finer details but there are specialist available and I will book your early appointment with them and they will assess you and they will be in a better position to tell you what treatment you fits on, and what treatment they will offer."*

- *"Is there anyone in the home to support you? ..... How you came here - by driving? I will advise you not to drive home on her own...... We can arrange an ambulance to drop you back .... I will inform your GP for primary care support."*

▶ Referrals

- *"There is a Multiple Sclerosis Society that will support you through this difficult time. I will give you the contact number of this society."*
- *"I will also give you the telephone number of MS specialist nurse."*
- *"I will also book your appointment with the brain specialist."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"This must be a great shock for you. You will need time for all this to sink in so I suggest we meet again in a few days so I can answer all your questions".*
- *"You can also talk to me on this contact number if you need further advice."*

Scenarios of chronic illness

- Multiple sclerosis, DM, rheumatoid arthritis, motor neurone disease

Different phases of bad news receivers

- Denial, anger, acceptance and hope.

F. ETHICAL AND LEGAL ISSUES

- A patient with a functional illness
- Brainstem death testing and organ transplantation
- Hospital postmorterm
- Coroner's postmorterm
- Do not attempt resuscitation decisions
- Withholding information from patients
- Maintaining patient confidentiality
- Advance care decisions
- Healthcare decisions for a patient who lacks mental capacity
- Care of the vulnerable adult
- Blood transfusion for a Jehovah's Witness
- Eligibility for major surgery
- Postponement of an investigation
- Clinical error in drug administration
- Fitness to drive
- Limits of treatment in end-stage disease
- Withdrawing treatment
- Unrelated live donor transplant

31. A patient with a functional illness (IBS)

Your role:	You are the doctor in the gastroenterology clinic
Problem:	Dealing with a patient with functional illness
Patient:	Mrs. Mehwish Bibi, 42-year-old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This lady has recurrent abdominal bloating and diarrhoea for 18 months. She opens her bowels 3-4 times most mornings, associated with crampy abdominal pain often relieved by defaecation. Her stool contains mucus but no blood. She does not have any ALARM symptoms. His GP has done investigations which are all normal including TFTs, coeliac screen and USG abdomen. The GP has made a diagnosis of IBS and commenced her on Buscopan, but she is not improving. She is worried, as one of her aunts has colon cancer. She wants to see a specialist because she feels she needs to have further tests (e.g. a colonoscopy and CT scan).

Your task: to reassure her about the diagnosis of IBS and negotiate a management plan with her.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the bowel clinic. Are you Mrs. __________? Well, nice to meet you madam."*
- *"Well, I understand that you were having some crampy tummy pain often relieved by defaecation and loose motion, and for that you were investigated, and the GP gave you some treatment as well. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your probable diagnosis and what we can do further. Is that ok? So before I proceed further, will you tell me that how are you feeling now? ....."*
- *"Will you tell me that, do you want any of your relative or the partner or the friend to be with you during this discussion? ...... Ok."*

▶ Tell

- *"Would you like to tell me a little bit more about your problem? ... Do you have loss of appetite, weight loss, throwing up of blood, blood from back passages, and difficulty in swallowing...?"* ***(Ask about red flag symptoms)***
- *"I am pleased to inform you that the investigations (blood tests, USG scan) which were done by your GP are all normal ......"*
- *"What you have been told by your GP about the possible cause of your problem? ...... What you think is going on? ...."*
- *"I also think the most likely diagnosis is irritable bowel syndrome."* ***(Golden silence)***

▶ Help & Explain (Body of skill)

- *"What do you understand about irritable bowel syndrome (IBS)? ...... Whether you want me to tell what is this? .... "*

Q: Ok, doctor tell me more about irritable bowel syndrome.

- *"It is a relatively common disorder of the bowels, in which the nerves or muscles of the bowel become active. Its cause is not entirely known. Stress can play a greater role, as many patients at the onset of IBS symptoms* *have a stressful event in their life. Other possibility could be a bug infection (viral or bacterial) which may trigger the development of IBS."*

- *"Is there any stress in your life regarding your occupation or social life?"*
- *"Is there any particular concern?"*

Q: My aunt had colon cancer and I suspect that I might have it. So, I want to have a CT scan or colonoscopy?

- *"I can appreciate your concerns and can understand that your aunt were having cancer, and you are worried because of that. But I re-assure you that your symptoms and investigations are not suspicious of any serious problem like cancer or IBD. There is nothing to be gained more with invasive investigations like CT scan or colonoscopy or OGD. Because its hazards are more as compared to the benefits and it is not recommended at this stage."*

Q: But I think I have some serious problem and need to have further investigations like a scan.

- *"Ok, I will arrange a second opinion for you with my consultant. I will book your appointment with him, and he will be in a better position to tell you what is better for you."*

Q: What is the treatment for IBS, and how you will manage it?

- *"It is recommended that IBS patient should have regular meals without leaving too long gaps in between, drink at least eight cups of fluid a day, restrict tea and coffee to three cups a day, decrease the consumption of alcohol or caffeine-rich drinks and limit the intake of high-fibre food. Some patients find probiotic drinks helpful."*
- *"You need to try antispasmodic agents when required. Stress relaxation therapy may also help your symptoms by reducing your stress and anxiety levels."*
- *"If you develop any 'red flag' symptoms, see your GP or come back to the bowel clinic urgently as further tests may be required."*

▶ Referrals

- *"I will book your appointment with my consultant for second opinion to address your concerns regarding further investigations."*
- *"I am also giving you information leaflets about IBS to take home."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"We can make a next appointment in a few days, so that we can discuss the matter again."*
- *"You can also talk to me on this contact number if you need further advice."*

- According to GMC guidelines, patients do not have the right to demand any investigation or treatment which is not clinically indicated (considering to be of no benefit to him). It would be unethical if the doctor will not ensure his obligation to 'do no harm' by weighing up the risks of inappropriate or unnecessary procedures against the benefits. Discuss with the patient in more detail the reasons for his request. If, after this discussion, the patient still requests the intervention, the doctor can refuse to provide it. Explain this decision clearly to the patient, document it clearly and inform the patient about other options, including their right to a second opinion.

Scenarios of functional illnesses

- IBS, fibromyalgia

32. Brainstem death testing and organ transplantation

Your role:	You are the doctor in the intensive care unit
Problem:	Discussing with next of kin regarding brain stem death and organ donation
Patient:	Mr Abdul Qayyum, 55-year-old
Relative:	Miss Saadia, the patient's only daughter and next of kin

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient was admitted by you ago with history of sudden headache followed by loss of consciousness. The CT scan has shown a large intracranial haemorrhage with mid-line shift. The patient was intubated, sedated and transferred to ICU. After looking at his extremely poor prognosis, the neurosurgeons, intensivists and your consultant agreed that neurosurgical intervention would be inappropriate. Sedation has been discontinued 36 hours ago, but patient has not shown any neurological response. Now, the brainstem death has been confirmed by two consultants. Patient is still on ventilatory support, having sinus rhythm, and normal BP. The patient's daughter has been fully informed about his condition and poor prognosis and has been told also that special 'brain testing' is being performed. But she has not been yet informed about confirmation of brain stem death. She is not knowing what brain stem death is, in the presence of functioning heart. She is waiting in the visitor's room for an update.

Your task: to explain to the daughter the diagnosis of brainstem death, what this means, and sensitively approach the idea of organ donation.

▶ Greeting

- *"Hello! I am Dr ________________, one of the doctor in the intensive care unit. Are you Miss ________, the daughter of Mr ___________? Ok."*
- *"Well, I understand that your father was admitted to the hospital with some serious condition. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your father's condition and what we can do further. Is that ok? So before I proceed further, will you tell me that what do you know about your father's condition? ….."*
- *"Will you tell me that, do you want any of your relative or the partner or the friend to be with you during this discussion? …… Ok."*

▶ Tell

- *"Mr Robinson was admitted to us in the intensive care unit, and he is having large bleed in his brain…… He is not showing any signs of improvement and there have been no indications at all that he will recover consciousness…… Despite the best medical effort by my team and by nursing staff, your father is not improving."*
- *"Because of bleed in the brain, his brain has suffered irreversible brain damage……."*

Q: What is this, doctor?

- *"It means that once brain cells are damaged, they cannot be replaced. So, these cells will never recover. As a result, your father will never wake up……."*

- *"As a result of the bleed, it is decided and confirmed by our two specialist consultants that your father is now brainstem dead."*

Q: What does brain stem death mean, doctor?

- *"The important part of the brain is dead, which is controlling heart and breathing. So, it means that your father is technically dead."*

▶ Help & Explain (Body of skill)

Q: No, no doctor! My father heart is still working. How can you say he is dead?

- *"Your father is relying on the artificial machine to do breathing for him and as soon as we will stop the machine, your father's breathing will stop and then heart will stop as a result. Thus, your father's heart and lungs are being artificially maintained, because brainstem death equates with the death of an individual."*

Q: What will you do further?

- *"The next appropriate step is to stop the artificial respiration."*

Q: No, no, you are letting my father die?

- *"This decision in not my own. It is done by our 2 consultants, and this is not to cause your father to die, because he is already technically dead. So continuing ventilation is not going to bring him back, because brainstem death means the patient's death."*
- *"It is not the family who is making the decision, it's the decision of the medical team."*

Q: Ok doctor, what's next now?

- *"As your father has died, but there is no damage to other organs, in these situation families are approached for the organ donation."*
- *"What do you think about it? ..... If your father has ever made views on it? Had he ever expressed any objection over it? What do other family members feel about it? Any religious obstacles?"*
- *"If your family is willing to consider it, I will speak to the transplant team who would then approach you. Can you please tell me that whether your father was suffering from any type of cancer? ..... The team will carry out routine microbiological screening tests, e.g. for hepatitis B and C."*
- *"In such situation, the artificial respiration will be continued till the organs are retrieved."*
- *"Once organs are retrieved, ventilation would be withdrawn. As your father is already brainstem dead, he will not suffer any distress or pain due to it."*

Q: How long will he have after you turn off the breathing machine?

- *"As soon as we will stop the artificial breathing machine, your father's breathing will stop and then heart will stop as a result."*
- *"Do you have any other queries?"*

Q: Whether the transplantation would delay his funeral? Will his body become disfigured?

- *"It will not affect your funeral plans. The surgery carried out to remove a donor's organs is carried out by highly skilled professionals who take the same care and attention and offer the same respect as they would in any operation to save a patient's life. The surgical incisions are carefully dressed after the surgery and any end of life care wishes in relation to the washing and dressing of the body are respected. The body is clothed for burial, so there are no visible signs of organ or tissue donation."*

▶ Referrals

- *"I am giving you information leaflets also about brain stem death."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"You may need time to think over it. We can meet again later in the day, so that we can discuss the matter again."*

Brain stem death

Steps to approach family members to pronounce death

- **Step 1:** Inform about the poor prognosis and recovery
- **Step 2:** Raise the possibility of brain stem death, and tests being performed to confirm it.
- **Step 3:** If brain stem death fairly certain, tell clearly that the person is declared dead if confirmed with neurological criteria.

Royal Colleges guidelines on death and brain stem death

- Death means irreversible loss of those essential characteristics which are necessary for the existence of a living person like breathing and heart. But there is no legal definition of death. Brain stem death equates with the death of a person.
- Consider the following conditions before making the diagnosis of brain stem death:
    - No doubt about irremediable brain damage of known etiology
    - No evidence of any depressant drugs
    - Primary hypothermia excluded
    - Potentially reversible circulatory, metabolic and endocrine disturbances have been excluded
    - No spontaneous respiration
- The diagnosis of brainstem death means that all brainstem reflexes are absent. It must be made by two medical practitioners (one has to be a consultant) who have been registered for over 5 years, who are competent in this field, must not be members of the transplant team and they must test separately. The legal time of death is when the first test indicates brainstem death, and not some later time when ventilation is withdrawn or the heartbeat ceases. Diagnosing brainstem death includes the following:
    - Pupils fixed and not responding to light
    - Absent corneal reflex
    - Absent vestibulo-ocular reflexes
    - No cranial nerve motor responses
    - No gag reflex or reflex response to bronchial stimulation (suction catheter placed down the trachea)
    - No spontaneous respiratory movements. Allow PaCO2 to exceed the threshold for respiratory stimulation as measured by ABGs (6.6kPa). Prevent hypoxia during disconnection by delivering O2 at 6 L/min through a catheter in the trachea.

Organ donation

- UK Transplant manages the Organ Donor Register, the national transplant waiting list, and matching & allocation of organs and tissue. Transplant co-ordinator of hospital trust (usually a nurse specialist) act as the link between the medical teams, the deceased person's family, the Coroner's Office and the UK Transplant authority.
- Medical or nursing staff contact the transplant co-ordinator before brainstem testing. Once the first brainstem tests confirm brainstem death, arrange a meeting of transplant co-ordinator with the family.
- If a patient carries a signed donor card or has been included in the NHS Organ Donor Register, there is no legal requirement to establish lack of objection on the part of the relatives, although it is good practice to consider the relatives' views. (Confirm registration for willingness of donation of all or some of organs from NHS Organ Donor Registrar).
- Removal of organs is authorized only if deceased has not expressed an objection to his body being so dealt with after death, that the surviving spouse, partner or any other surviving relative of the deceased does not object to the body being so dealt with, and that there are no religious obstacles.
- Once the family has no objection, the medical team and transplant co-ordinators should inform the UK Transplant authority as soon as possible and carry out blood tests for microbiological screening, blood grouping and tissue typing. Maintain care of deceased person to optimise functions of transplantable organs (cardiovascular & respiratory support, correction of hypovolaemia, treatment of anaemia and deranged coagulation, etc.).
- Surgeon must, on the basis of examination done personally and the brainstem tests carried out, be satisfied that the patient is dead. Microbiological safety must be established prior to organ transplant.
- If the death has been referred to the Coroner's office or is a police/legal case, permission must be sought from the coroner or procurator fiscal.

33. Hospital postmorterm

Your role:	You are the doctor in the medical ward
Problem:	Discussing hospital postmorterm with next of kin
Patient:	Mr Shahbaz Haider, 70 years old
Relative:	Mrs. Zarina, the patient's daughter and next of kin

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient was admitted 5 days ago with respiratory failure. He was having multiple condition including renal failure, COPD and IHD. His CXR showed a left basal pneumonia that was treated. It was decided, by involving all concerned, that ventilatory support will not be provided. After 5 days, the patient collapsed in the hospital's toilet and expired despite resuscitation attempts. His daughter, who was well aware of her father's condition and informed about the cause of death as pneumonia, was in a real shock after hearing that her father collapsed and died last night. But she took the news bravely and realistically. She has come to the hospital for the death certificate to take it to the Registrar of Deaths in town today and start the funeral plans. You and the consultant are concerned that it might be a bronchial carcinoma which has been missed behind the heart technically. The consultant suggested that the only way to decide, whether it was bronchial carcinoma or pulmonary embolism, is the hospital postmorterm after getting permission from the daughter. If it is refused by her, the consultant will write the death certificate anyway.

Your task: to ask the daughter for permission of hospital postmorterm and to arrange it.

▶ Greeting

- *"Hello! I am Dr ___________________, one of the doctor in the medical ward. Are you Mrs. __________, the daughter of Mr _____________? Ok."*
- *"Ok, Mrs. __________, I am feeling so sorry to hear about the sudden death of your father..... Me and my all the staff looking after him, we are sad by the news......"*

▶ Agenda setting --

▶ Tell

- *"Your father was very sick when he came with us in the hospital. He was having chest infection, and he was managed appropriately but his condition was not improving."*
- *"Me and my consultant, we are surprised by the suddenness of his death."*

Q: What could be the reason for this doctor?

- *"It could be the reason that there may be a blood clot in the blood channels of your father's lung (pulmonary embolism). But we are also concerned that there may be some mass in his lung which was not picked up by the CXR, being behind the heart shadow."*

Q: The doctor who was on duty last night had told me that my father had died because of a bad pneumonia. Then why are you suddenly thinking of something else now?

- *"We cannot surely say what has caused the death of your father."*

- *"The only way to know what actually caused this sudden deterioration is postmorterm. How do you feel about it? ...... How do you understand about it? ....."*

▶ Help & Explain (Body of skill)

- *"If you know that your father himself had any objection to the postmorterm? ...."*
- *"If you feel uneasy about a full postmorterm, we can do a limited postmorterm of the chest as well."*

Q: What is a postmorterm examination? Who perform it? Where it is done?

- *"It is the internal examination of the deceased person to know the exact illness which has caused the death and the effects of the illness on his body. However, some questions will be left unanswered even after detailed postmorterm."*
- *"It is carried out in a special facility within the hospital mortuary by a doctor who has specialized in the study of disease and diseased tissue in laboratory (pathologist), assisted by a person having specialist training (technician). It is done according to the standards set by the Royal College of Pathologists, in a respectful way and with regard for the feelings of the bereaved."*
- *"The specialist doctor carry out an external examination of the body first. For internal examination, an incision is made down the front of the body and the internal organs are taken out for a detailed examination. To examine the brain, an incision is made in the scalp at the base of the head, which is not visible around the face. Small tissue samples are usually kept to look under the microscope. The relative are asked to give written agreement if the body parts or organs are needed to be kept for detailed laboratory investigations."*

Q: What are the benefits of a postmorterm examination?

- *"It can give valuable information about the illness, its effects on the body and the cause of death, making it easier for the family members to come to terms with the death. It may also provide valuable information for the treatment of other patients with the same kind of illness and for research as well."*

Q: Would it be a full or limited postmorterm examination?

- *"A full postmorterm involves detailed examination of all the internal organs including brain, heart, lungs, liver, kidneys, intestines, blood vessels and the small glands which are all removed from the body, examined and returned back to the body."*
- *"A limited postmorterm examination is an alternative way, if relatives feel uncomfortable with a full examination, where only the organs directly related to the illness are examined. In such situation, there would be no information about the other organs which may have contributed to the death."*

Q: When will the postmorterm be carried out?

- *"Usually within 2–3 working days. The actual examination may take 3 hours, but laboratory investigations may take several weeks."*

Q: Would it delay my father's funeral? What will be the arrangements for reunion of organs with the body before the burial?

- *"Funeral arrangements are not needed to be delayed. However, it may be delayed to several weeks if relatives wish the organs to be reunited after laboratory analysis. The doctor issue a medical certificate of death before postmorterm to proceed with the arrangements for the funeral. After the postmorterm, the body of the deceased is released to the undertaker on the same day."*

Q: Whether the postmorterm will disfigure the body of my father?

- *"The body will not be disfigured because the internal incision in the chest and tummy will be well covered with clothes. While the scalp incision, if the brain has been examined, will be concealed by the hair at the back of the head. After the postmorterm, the technician will prepare the body for relatives to see again if they wish."*

Q: Why an organ may be kept?

- *"As per the informed consent agreement, the pathologist can keep a specific organ for several weeks to examine it in detail or to discuss it with other clinicians and pathologists if any suspicious thing is found before issuing the postmorterm report; or often indefinitely for educational (in medical museums), research or legal purposes."*

- *"The pathologist, on behalf of the hospital, would become the custodian of the organ which would be kept in a safe place under secure conditions in the hospital. The identity of the organ and the diagnosis would be confidential. The hospital can respectfully dispose of the organ or return it to the relative for cremation or burial. Even if it has been agreed to be kept indefinitely, and you change your mind in future, the hospital will dispose of the organ in the legal and proper manner or will return it to you for cremation or burial as you wish."*

Q: No, I don't want that my father's body parts are to be retained?

- *"Then the other opinion is to fix and examine the tissue of interest, and then return them to the body before release. The organs will not be retained in this way."*

Q: When will I get the results of postmorterm report?

- *The result of the postmorterm will be sent to the consultant looking after your father, and you can take it from him."*
- *"Do you have any other concerns? ...... Do you agree with the postmorterm?"*

Q: No doctor, my family is already having a difficult time, I just want to go on with the funeral arrangements without any delay.

- *"Ok, I respect your decision wholeheartedly and will issue a death certificate straight. On that, the reason will be written as lung or breathing failure (respiratory failure), chest infection (pneumonia), chronic degenerative smoker's lung disease (COPD), waterworks failure (renal failure), the disease of heart due to blood channels of the heart (IHD)."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

Hospital postmorterm

Important things when asking consent for the hospital postmorterm examination:

- Consent given or refused by the deceased before his/her death
- Consent of a nominated person chosen by the deceased person before his/her death
- Consent of an individual in a 'qualifying relationship' to the deceased

If the deceased person's relatives object to the postmorterm examination but the deceased has consented for it:

- Discuss the matter with the relatives sensitively and encourage them to accept the deceased person's wishes. However, the relatives do not have a legal right to overrule the deceased person's wishes.

Chief Medical Officer's recommendations for obtaining consent for hospital postmorterm (2001)

- Provide clear written information to the relatives about what the examination means and why it is required
- Written agreement to the postmorterm and options to limit the examination
- Written informed agreement or not to the retention of organ, body parts, tissues or body fluids
- Details on who is agreeing to the postmorterm, their relationship to the deceased, who obtained and witnessed the agreement, their position within the trust and contact details with the date of the agreement.
- PM examination may also be requested by the deceased person's family or medical team ('hospital postmorterm') in the following situations:
  - to identify the cause of death
  - to confirm the nature or extent of a disease
  - to identify other undiagnosed conditions
  - to identify complications or side-effects of drugs or other treatments

34. Coroner's postmorterm

Your role:	You are the doctor in the intensive care unit
Problem:	Discussing postmorterm requirement of a patient died in fight
Patient:	Mr Danish Randhawa, 16 years old student
Relative:	Mr Khaleeque Randhawa, patient's father

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This young student had some fight with his colleague yesterday on his way back from school. He sustained head injury due to a blow to his head, collapsed and lost consciousness straight away. He was brought to hospital with a GCS of 3/15, intubated, ventilated and admitted to the ICU. CT scan head showed a major intracerebral bleed. There was no signs of neurological recovery 24 hours later and brainstem testing by two consultants confirmed brainstem death. The parents were told about this and ventilator was switched off during their presence by the bedside. As the other boys involved in the fight ran away, so nothing is known about how, why and who assaulted him, it is now a police case and an inquest and a coroner's postmorterm need to be carried out. The father is not keen on this initially because he feels the death of his young son is devastating enough for the family and they want to grieve in private and arrange for his funeral without delay.

Your task: to speak to his father and tell him about the need for a coroner's postmorterm and what this will mean for the family.

▶ Greeting

- *"Hello! I am Dr ___________________, one of the doctor in intensive care unit. Are you Mr __________, the father of Mr _____________? Ok sir."* **(No good morning or nice to meet you)**
- *"Sir! I am feeling very sorry for the loss of your son... I can understand that this is a very sad news and very difficult to cope with.... How are the other family members and her mother? .... How are they dealing with?"*
- *"Whether anything else you will like to ask to me or talk to me first......."*

▶ Agenda setting

- *"Now, I will talk to you regarding some issues before the funeral of your son. Has anybody spoken to you, like police has told you anything or any hospital staff has talked to you about the procedures?"*

▶ Tell

- *"As your son was hit by a school fellow and it is an assault, so now it will be referred to the police and the criminal justice system for further inquiry...."*
- *"I can realize that what I will say now, it's very upsetting and very sad for you, and disturbing as well. But it is important right now to tell you so that you know what procedure we are going to follow, because it isn't clear at this stage exactly what happened to your son. So, a coroner's postmorterm (PM) examination needs to be carried out."* **(reaffirm again if needed)**

▶ Help & Explain (Body of skill)

Q: Why a coroner's PM is required?

- *"A coroner's inquest is a fact-finding inquiry to establish the identity of deceased person and how, when and where he died. It is not within the coroner's jurisdiction to determine who was responsible for the death (done by criminal or Crown courts)."*
- *"If the case is suspected to be murder or manslaughter and is referred to the court for trial, then the coroner's inquest will be adjourned (but not the postmorterm)."*
- *"On completion of the PM examination and/or the coroner's inquest, the death certificate will be issued, and the Registrar of Births and Deaths informed."*

Q: Who is coroner?

- *"He is an independent judicial office holder (a lawyer or doctor by profession), and work together with deputies and assistant deputies, in the coroner's office."*

Q: Which deaths needs coroner's PM?

- *Deaths occurring in violent, unnatural or suspicious circumstances*
- *Sudden or unexpected deaths (unknown cause)*
- *Deaths occurring in prison or police custody*
- *If no doctor attended to the deceased during his last illness (or there is an attending doctor, but he had not seen the deceased within 14 days of the death)*
- *Death during surgery or before recovery from anaesthesia*
- *Death due to industrial disease, accident or poisoning*

Q: My son has been through enough! Don't do the coroner's PM as we have the right to say 'no'.

- *"I can realize that it is difficult for you, but the family have no right to object or interfere it as by law, the family's consent is not needed for it. However, we do inform the family about the whole procedure. Because the deaths occurring due to certain situations like criminal activity are referred to the coroner's office, police and criminal justice system, and then it is the coroner officer who will decide it."*
- *"You can discuss it with your family and with your ex-wife. I can let you have some time to do this."*

Q: Can the doctor doing it (pathologist) retain the organs? I won't let them to steal my son's organs.

- *"The pathologist may retain some of the organs for investigations till the criminal investigation is complete and the retained organs are no longer required. The family can decide whether to wait for these organs to be returned to the body before holding the funeral or they can go ahead with the funeral and then the retained tissues and organs can either be returned to the family for their own arrangements (if requested) or disposed of by the coroner by burial or cremation in a sensitive and respectful way. But if pathologist wishes to retain them for research or teaching purposes, then consent will be sought from your family."*

Q: We want the funeral as quickly as possible. Will the PM delay it?

- *"The coroner's PM usually takes place without delay and the body will be returned to the family soon after to allow the funeral arrangements to proceed. A coroner's officer and a police family liaison officer will keep you informed about the situation."*
- *"You can also discuss it with some spiritual adviser...... or you want me to contact the hospital on-call chaplain."*
- *"I would like to say thank you for your patience. Is there anything else you would like to talk about or if you have any questions about the matters discussed?"*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"This must be a great shock for you. You will need time for all this to sink in so I suggest we meet again so I can answer all your questions."*

35. Do not attempt resuscitation decisions

Your role:	You are the doctor in the elderly ward
Problem:	Discussing 'Do Not Attempt Resuscitation' decision with next of kin
Patient:	Mrs. Munawar Mehmood, 80-year-old
Relative:	Mrs. Khadija, patient's daughter and her next of kin

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This elderly lady is bed bound after suffering from stroke 3 years ago. She has developed vascular dementia with gradual deterioration of cognition. She is also known to have IHD, DM and previous breast cancer (treated 20 years ago). She was admitted to hospital 5 days ago with UTI, but she is not improving despite IV fluids and antibiotics. The consultant feels it is appropriate to sign a 'Do Not Attempt Resuscitation' (DNAR) form for her. Her daughter is not agreeable to this feeling that her mother will just be 'left to die in the corner of the ward'. She also feels her mother is improving as her mother opened her eyes and smiled today. The daughter is also worried about her mother's nutrition as she often refuses her food. She has heard about artificial feeding 'through a tube into the stomach' and wonders if her mother can be considered for this.

Your task: to discuss with patient's daughter about the DNAR decision and address any concerns she may have.

▶ Greeting

- *"Hello! I am Dr __________________, one of the doctor in the elderly ward. Are you Mrs. _________, the daughter of Mrs. ____________? Ok."* ***(No good morning or nice to meet you)***

▶ Agenda setting

- *'Well, I am here to discuss with you about the condition of your mother and what we can further. Is that Ok? Before I proceed further, will you tell me that what you know about your mother's condition?* ***OR*** *Do you want me to update you about your mother's condition?"*

▶ Tell

- *"Yes, you are right. Your mother was admitted with waterworks infection, but it does not appear that she has made much of an improvement despite the best possible treatment.* ***(Silence)*** *Although my nurses, doctors and ward staff are taking care for her a lot, but still she is not improving."*
- *"I am very sorry, but your mother isn't very well'.* ***(Silence)*** *"Because as you know, your mother has lot of health problems and this latest waterworks infection has caused further deterioration for her ability to recover."* ***(Silence)***
- *"Ok, have you ever thought what would happen in a situation when your mother's health condition deteriorates further or if she does not recover from such an illness?* ***(Silence)*** *Have you taken a chance to speak with your other family members? What are your and other family members' thoughts about this?"*

Q: Since my mother suffered the severe stroke 3 years ago, I was aware that the prognosis was not very good. Is anything new doctor?

- *"I want to tell you that today our consultant reviewed your mother during the ward round, and it felt that there is a possibility that your mother may deteriorate further and might die in the near future."* ***(Silence)***

- *"In view of your mother's multiple health problems and poor quality of life, the consultant feels that resuscitating your mother in the event of a cardiorespiratory arrest would be futile. The medical team feel that adopting a 'Do Not Attempt Resuscitation' (DNAR) care pathway is appropriate."* ***(Silence)***
- *"Do you want me tell what this is?"*

▶ Help & Explain (Body of skill)

Q: Doctor, tell me what this is?

- *"When patient's heart and breathing are not working by their own, and the patients are fit medically, we are supporting them artificially by the machines. But in your mother's case, already she is having multiple health problems and poor quality of life, so our consultant has decided not to support them artificially (DNAR decision) if they stop working by their own."*

Q: I want you to explain very clearly to me why you want to let my mother die?

- *"It does not mean that we are letting your mother die. Your mother will receive other medical treatment to keep her as comfortable as possible."*

Q: Doctor, please don't take this DNAR decision for my mother.

- *"For DNAR decision, there are many factors which need to be considered, and this is not because of your mother's age. For cardiopulmonary resuscitation success, the major organs need to be in good health, and this is not the case with your mother. This is a form of "advanced care planning' which allows health professionals to think how best to care for patients in a way that is respectful and that ensures that they have a peaceful and dignified death."*

Q: Does this mean you're just going to leave my mother to die on her own, and she will not be taken proper care?

- *"I reassure you that your mother will continue to receive full medical and nursing care, with due attention to all her needs. If you have any concerns at any time that your mother is not receiving basic care then you should inform the ward nurses/manager /doctors immediately."*

Q: I am sure she would get better if only she would eat. Can't you put a tube into her stomach and feed her that way?

- *"A DNAR decision is not final and is reviewed by the team on a regular basis and if your mother shows significant improvement with the treatment she receives, then the decision may be revoked if appropriate."*

Q: I feel guilty that you are letting my mother die.

- *"This decision is made by our most senior clinician in charge of the patient after careful thought and discussion within the team. So, it's the team decision and a medical decision. It's in the best interest and we will take proper care of your mother. If your mother's condition improves, it can be revoked. It is discussed only as a compassionate with the family/next of kin to find out their thoughts, because it's not the legal obligation of the clinician, and to enquire about any advance directive or Power of Attorney issues."*

WE WILL NOT AGREE TO THE END.

- *"Is there anything else you would like to talk about or if you have any questions about the matters discussed? You can also involve any religious advisor if you want."*

Q: I want to discuss this matter with my other family members as well. Is there someone else I can speak to?

- *"I can ask my consultant to be present too if you wish to speak directly to him/ her."*
- *"I would like to say thank you for listening to me."*

▶ Referrals —

▶ Reassure —

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***

- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I can understand this news must be hard to hear for you. You will need more time to think about the issue raised. So, I suggest we meet again so I can answer all your questions."*

- Neither patients, nor their family or friends, can insist on medical treatment (including CPR) which the clinicians feel is inappropriate for the patient. Therefore, if the clinician believes that CPR is unlikely to be successful in restarting the person's heart or lungs then it should not be attempted. No one can object. If such a situation arises, the clinician should try to explain the issue once again to the concerned parties and, if they are still not in agreement, a second opinion should be sought.
- LPA cannot demand treatment (including CPR) if it is clinically inappropriate. When there is disagreement which cannot be resolved with a second opinion, then it may be necessary to involve the Court of Protection.
- Since survival rates from cardiopulmonary arrests are low (15–20% for in-hospital arrests and 5–10% for out-of-hospital arrests), healthcare professionals need to carefully consider the risks versus benefits of prolonged CPR attempts for a patient.

36. Withholding information from patient

Your role:	You are the doctor in the general medical ward
Problem:	Discussing issue of withholding information from the patient
Patient:	Mrs. Sobia Tariq, 65 years old
Relative:	Mrs. Maryam, patient's daughter

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This lady from Gilgit Pakistan was admitted 2 days ago with cough and haemoptysis. As per her previous medical notes, she is being investigated by the respiratory team for a suspected lung malignancy, picked up on a chest X-ray. A CT chest showed that the mass is resectable, depending on the histology. Bronchoscopy failed to obtain sufficient tissue for histological diagnosis. Now, the consultant is referring her for a CT-guided lung biopsy. As she speaks very little English, so her daughter is explaining and translating everything to her, as she preferred her daughter to do that once official interpreter was offered to her. The patient's daughter does not want to tell her about lung cancer fearing that 'she will just give up hope and refuse all treatment', thinking she is not strong enough to absorb this news after her husband's death 6 months ago. The daughter anyhow understands that her mother has a right to know her diagnosis. The patient also appeared to be asking you in a mixture of poorly understandable language about her problem during the morning ward round.

Your task: to talk to patient's daughter about the likely cause of her mother's symptoms and about discussing the possible diagnosis with the patient.

▶ Greeting

- *"Hello! Good morning. I am Dr ____________________, one of the doctor in the medical ward. Are you Mrs. __________, the daughter of Mrs. _____________? Well, nice to meet you madam."*
- *"Well, I understand that your mother is admitted with cough and some other problem. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your mother's condition and what we can do further. Is that ok? Before I proceed further, will you tell me that what you know about your mother's problem? ......"*

▶ Tell

- *"Ok, well she is admitted to us, and we did some tests over her which revealed that she is having some lung mass. This is the reason I would like to speak to her about this matter now."*

▶ Help & Explain (Body of skill)

- *"How much you think your mother knows about the probability of having a lung cancer and what the family have told her so far, or has she an idea?"*

Q: We deliberately did not inform our mother about any horrible diagnosis, as she is already sad after my father's death.

- *"I appreciate your concerns, and I can understand your feelings."*

- *"If your mother has ever asked about what is going on or ever, she expressed a desire to know what's going on? ..... Today during the ward's round, she inquested as she was interested and wanted to know what is going on."*
- *"In a situation like this where the patient appears to be asking the doctor for the possible diagnosis or anything about her health, it would be unethical for the doctor to withhold that information from the patient. It will also increase the anxiety of the patient about her own health. So, we have to tell the patient. If the patient is competent and wants to know about her condition then we tell the patient, and after asking the patient we will tell the family. This is the prime right of the patient. Unless, if the patient himself or herself has referred that tell everything to the family, in that case we tell the family.* ***(Discuss pros and cons of not telling suspected diagnosis)***

Q: Are you accusing me of lying to my mother? I think you should respect the family's wishes in this matter. We are the ones who care for Mum 24/7 and know best when and how she should find out about the cancer.

- *"Whatever we are discussing with each other, it is in the best interest of your mother. She is the foremost and first duty for us, and important for us."*
- *"She is due for a CT guided lung biopsy. Do you know what the meaning of lung biopsy is? ...... We are taking the piece form lung. For this biopsy, we need to take an informed consent from her. On behalf of a competent adult, no one else can give it (even if the patient requests the medical team, partner, relative, carer or another person to do so on their behalf), and your mother is competent enough. So, before giving the consent, she will need to know the indications for the procedure and its intended benefit."*
- *"Because your mother does not understand the English, we will not ask you to explain her about the diagnosis but will arrange some independent interpreter (to avoid undue discomfort to her or potential pressure from the family). This will be done in the absence of the family, but we will inform the family that we are going to do this. We will give every possible information to your mother and we will also take her insight that how much she wants to know, so that all necessary information we can give her. We will inform you about the outcome of this discussion."* ***(document also the content of this conversations clearly in the notes)***

Q: I do not want to inform my mother about the cancer?

- *"Ok. I will need to speak to my consultant. I will book your appointment, so that you and your family members can meet the consultant and he will be in a better position to answer your questions."*
- *"I can also arrange your meeting with the patient advocacy team."*
- *"I will request the respiratory team consultant already seeing your mother to review her on the ward and offer his specialist opinion. I will also let the palliative care nurses and the lung cancer team know that your mother is in hospital."*
- *"I would like to say thank you for your time."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"You can also talk to me on this contact number if you need further advice."*

- GMC recommends that you should not withhold information necessary for making decisions for any other reason, including when a relative, partner, friend or carer asks you to, unless you believe it would cause the patient serious harm. In this context, 'serious harm' means that the person might become upset and refuse treatment.
- If the doctor still feels that it is appropriate to withhold information from a patient, they should document the reasons for doing so clearly in the notes and be prepared to justify their decision later if required.

- In the UK, no one can make a healthcare-related decision especially with regard to consent for an investigation or treatment on behalf of a competent adult, even if the patient requests the medical team, partner, relative, carer or another person to do so on their behalf. If, despite discussion with the patient, they do not want to be given information about their health, the clinician should respect this as far as possible, but this may have implications for the validity of informed consent if it is required in the process.
- The minimum level of information a patient needs to know to give valid informed consent include:
    - Aim of procedure or intervention
    - Whether invasive or not
    - Amount of pain or discomfort patient is likely to experience
    - If the patient needs to undergo any preparation prior to it
    - Serious risks involved

37. Maintaining patient confidentiality

Your role:	You are the doctor in the medical assessment unit
Problem:	Discussing the disclosure of patient's confidentiality in a police case
Patient:	Mr. Akmal Nazeer, 20 years old student

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This young patient was brought to the hospital yesterday evening with a head injury that he sustained when out in the town while celebrating his friend's birthday last night. His GCS was 9/15 on arrival in A&E and had three episodes of vomiting. His CT head was normal. He improved after about 3 hours but was kept in overnight for neurological observations. He does not have any symptoms now aside from a mild headache and is awaiting a review before discharge. During pre-discharge assessment, he brings up another matter with you. He admits that he was involved in a brawl with a group of young men during which he received a blow to his head, which caused him to fall, and knocked him out. But before this, he tells you that he threatened one of the men with a knife after he was punched in the face. He does not know the identity of the man he threatened with the knife, how badly he was hurt or if he was taken to hospital. He also does not remember any of the events which followed until he woke up in hospital a couple of hours later. He is worried that this will have been seen on CCTV because he dropped the knife there and asks that you do not disclose his identity or tell the police about his hospital admission if they make enquiries after his discharge.

Your task: to respond to this additional news appropriately and assess patient's suitability for discharge.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in medical assessment unit. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having some head injury, for that you came to us, we treated you and did some tests. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your medical condition and what we can do further for you (whether we can discharge you or not). Is that Ok? So, before I proceed further, will you tell me that how you are feeling now? Tell me about any headache, vomiting or any confusion."*

▶ Tell --

▶ Help & Explain (Body of skill)

Q: I am fine now, doctor.

- *"Now the medical team is happy to discharge you, because they feel that you are out of this condition and out of your brain injury (concussion)."*
- *"Do you want me to tell what happened?"*

Q: What happened to me doctor?

- *"Well, you were brought in with a reduced consciousness believed to be from a head injury. The CT scan of your head was done but it did not show any serious injury such as a bleed in or around your brain. You were kept in hospital for overnight observation but as you are fine now, so we are going to discharge you."*
- *"Please tell me who will be at home with you to monitor you during the next 24–48 hours for any delayed complications? .... Would he be able to monitor you?"*

Q: What care should I take once discharged from the hospital?

- *"I have written advice along with discharge paper about the features you will look for in terms of delayed complications of head injury and also I mentioned whom to contact for help. Ok! I also have booked your appointment with the GP, and after 1 week you will see the GP."*

Q: I need to tell you that I had a fight last night and threatened another man with a knife, once I was punched in the face. There is CCTV in that part of town, and I am afraid that the police might be investigating it as I dropped the knife there. Doctor, can I ask you not to disclose any information about me to the police who may be investigating the knife crime?

- *"I can understand that you are frightened, but I am not making any judgement about you, and your request places me in a difficult situation."*

Q: Doctor, what do you mean by it?

- *"As a medical professional, I have a legal duty to help police in the investigation of crime including knife crime and gunshot wounds."*
- *"If I have reasons to believe that you will not pose a threat to the public, then I will not inform the police. However, if the police approaches me as part of the investigations into the crime, then I have to assist them in the investigation legally as I cannot withhold information form the police."*

Q: Doctor, I am telling you not to do it? (Threatening)

- *"I can understand that you are frightened, but the hospital has a strict 'zero tolerance policy' towards threats to the staff. If you will do so, then I will ask hospital security team to minimize any potential danger from you."*

Q: I feel regret that I acted outside the law and should not have done this. Please do not say anything to the police?

- *"I cannot commit it as it's my legal obligation to provide the information to the police if required to do so."*

Q: The doctors aren't allowed to tell the police because of patient confidentiality, are they?

- *"If you will insist me again and again, in such situations, I need to breach patient confidentiality without taking your consent if the police approach the hospital for information. However, I will not take such decisions on my own. I will inform my consultant and will discuss with him and will also take medico-legal advice as well."*
- *"What are your plans about this issue after discharge? I suggest you speak to the police yourself and co-operate with their investigations."*

  (Ensure to document all the above clearly in the patient's notes)

▶ Referrals --

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

Doctors my breach patient confidentiality if:

(But the patient should be informed about the required disclosure)

- If another party may be at serious risk of harm, e.g. an epileptic who continues to drive (the GMC advises doctors to inform the DVLA medical officer) or a HIV-positive patient who refuses to tell their sexual partner.
- Notifiable diseases
- Births and deaths registration / abortion / in vitro fertilization
- Organ transplant
- Drug addiction
- Police request
- Prevention, apprehension or prosecution of terrorists or perpetrators of serious crime
- Court order
- Local clinical audit
- Regulatory bodies who are investigating matters such as a healthcare professional's fitness to practice.
- Research, epidemiological surveys, education and training – provide anonymized or coded information if possible.
- Insurance companies, employers or government agencies evaluating welfare claims – the patient's written consent should be obtained first, and a copy of the report should be offered to the patient before it is sent off.

38. Advance care decisions

Your role: You are the doctor in the neurology clinic

Problem: Discussing advance care decisions in PD

Patient: Mr Musharraf Habib, 71 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient, diagnosed with Parkinson's disease 10 years ago, has progressive deterioration despite maximum treatment with intolerable side-effects. He has increasing difficulty in managing daily chores of life, and now planning to move with his son who also help him to manage his financial affairs. He is having fluctuating memory and, trouble in planning and managing daily activities. The consultant arranged a CT head, some blood tests and also referred him for psychology tests. The results of these are back and your consultant thinks that the patient is suffering from early Parkinson's disease-related dementia. The patient is worried for future decisions, if he has mental state deterioration. But he does not want life-prolonging treatment if fell ill. He want to discuss about the provision of appointing his son as a Lasting Power of Attorney (LPA) for healthcare and financial decisions on his behalf to ensure his best interests are safeguarded in the future.

Your task: to explain to the patient about probable diagnosis of early dementia and address any concerns he may have.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the brain clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having Parkinson's disease and for that you are being treated. You came to the hospital and some tests were done on you. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the results of your tests, the probable diagnosis and what we can do further. Is that Ok? So, before I proceed further, will you tell me that how you are feeling now or anything you want to share with me?"*

▶ Tell

Q: I want to know the results of the scan of my brain and the other tests which I had recently.

- *"Well, I have the results of your tests and it is showing that you are having an early form of dementia (Parkinson's disease-related dementia)."*
- *"Do you want me to tell you what dementia is?"*

▶ Help & Explain (Body of skill)

Q: What is dementia, doctor?

- *"It is an effect of Parkinson's disease which you are having. In this condition, the patients have memory problems as well as difficulty in managing finances, their tasks, planning and driving."* ***(Silence)***

Q: Is there any treatment, doctor? How will you manage?

- *"I am very sorry to tell you that unfortunately there is no treatment which can reverse this disease, but there is management, which is symptomatic, that means whatever problem you will have, we will give the treatment."* ***(Silence)***
- *"There are several avenues of support. There is PD specialist nurse as well as specialist doctors for this, and old age psychiatry team which will be there to help you."*

Q: Is there any provision in the health care system for safeguarding my interests in future, if my mental health deteriorates?

- *"Why you want to do this? Is there anything particular which you are afraid and going to happen to you in future? .... Or it is for what types of treatment you want, and what types of treatment you don't want in future? ...."*
- *"Ok, there are different options available. You can give an 'advance directive' as well as you can nominate a 'Lasting Power of Attorney (LPA)' who can make decisions on your behalf. Advance directive is more restrictive than LPA."*
- *"You can nominate more than one LPA for different decisions like health, personal welfare, finances and property."*
- *"Whether you have anyone in mind for LPA?"*
- *"If you want your LPA to consent to, or refuse, life-saving treatment on your behalf, it needs to be explicitly stated on the form, signed and witnessed."*
- *"If you want to nominate your nominee as a LPA, then both of you will need to sign a Lasting Power of Attorney for Health & Welfare document, and a separate LPA to manage your property & finances. These signatures need to be witnessed and certified by a professional like a GP or solicitor, and then registered with the Office of the Public Guardian."*
- *"You can find out more information about it from government website (www.direct.gov.uk). I can also arrange your meeting with solicitor which can guide you further."*
- *"Do you have any other concerns or any other questions?"*

▶ Referrals

- *"I will also give you the telephone number of PD specialist nurse."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I will be in touch with you again soon in the clinic in a few weeks."*

Q: Who is a competent patient?

Competent patient:

- A patient is said to be competent if he:
  - understands the information relevant to the decision
  - retains the information
  - weighs up the information before coming to a conclusion
  - is able to communicate the decision back in any form
- The patient should not be said to lack capacity just because he makes an unwise or eccentric decision.
- Remember that a patient who has capacity can accept or refuse any medical intervention even if the reasons for doing so may seem irrational to other people

Q: What is lasting Power of Attorney?

LPA

- If a patient is conferring authority to one or more individuals who are able to make decisions on healthcare or personal welfare in the best interests of the person when he does not have the capacity to do so himself. This includes refusing life-saving treatment.

Q: What is advance directive?

Advance directive:

- This is another means by which a person can make his wishes about healthcare decisions in the event if he loses his capacity. This is a document that allows the person to refuse specific treatment in specific circumstances. These decisions need to be clearly written, signed and witnessed.
- But advance directives are more restrictive than LPA, because it only allows refusal of treatment in specific circumstances. However, LPA give the attorneys authority to make decisions on all aspects of the patient's health and personal welfare, including giving consent to or refusing any life-saving treatment. If a person has both an advance directive and an LPA, the one that was signed most recently will generally be considered.

Q: If there is no advance directive or LPA, then how to proceed further?

Court-appointed deputy:

- Person appointed by the Court of Protection to make decisions on healthcare, personal welfare and finances on behalf of a patient (but they do not have the power to refuse life-sustaining treatment).

Court of Protection:

- If there is disagreement between an LPA's views and those of the healthcare professionals or other family members/friends, the case may be referred to this court. The court can make decisions or appoint deputies to do so.

Office of the Public Guardian:

- This department registers and monitors the operations of LPAs and court-appointed deputies.

Independent mental capacity advocate (IMCA):

- Person appointed by the NHS or local authority to support a person lacking mental capacity and does not have any family or friends to speak for him. IMCAs can give opinions on the person's wishes, beliefs and values to help decision-making in serious medical treatment or housing.

39. Healthcare decisions for a patient who lacks mental capacity

Your role:	You are the doctor in the elderly care ward
Problem:	Discussing PEG tube insertion in MS patient lacking mental capacity
Patient:	Mr Ghulam Shabbir, 60 years old
Relative:	Mrs. Shamsa Parveen, patient's wife and next of kin

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient having multiple sclerosis (MS) is bed ridden for last couple of years. He was admitted to hospital 5 days ago with aspiration pneumonia. He has poor swallowing and because of that his nutrition is affected (low albumin levels) and he has chest infection. Many trials for nasogastric tube insertion has failed because he was not able to tolerate them and kept pulling them out. Now the consultant decided to go for a percutaneous endoscopic gastrostomy (PEG) tube insertion. Although patient's wife understands that her husband's swallowing is affected but she is not interested in inserting a PEG tube. Her husband also mentioned to her a few years ago that he wished to be 'free from medical interventions or hospitals as far as possible and die peacefully' when his time came (although he did not actually make an advance directive or sign any other legal documents). You are about to speak to her, to talk about the procedure as it is felt that the patient does not have the capacity to consent to the procedure himself.

Your task: to discuss with patient's wife why a PEG tube is being considered and to find out her and the patient's views about it.

► Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the elderly care ward. Are you Mrs. _________, the wife of Mr_________, and his next nominated kin? Well, nice to meet you madam."*
- *"Well, I understand that your husband is admitted with some chest infection, and before this he was bedridden due to multiple sclerosis and was on treatment. Is that correct?"*

► Agenda setting

- *"Well, I am here to discuss with you about your husband's condition and what we can do further. Is that Ok? So, before I proceed further, will you tell me that, 'Do you have some idea about his condition'? ... Do you want me to tell more about your husband's condition?"*

► Tell

Q: Ok, doctor please tell me about him.

- *"Your husband is admitted with chest infection (aspiration pneumonia). This is because he has poor swallowing, due to which the food particles have gone into his windpipe, and they have caused infection there (you can draw a diagram as well). His inability to swallow safely has been confirmed on testing by the speech and language therapist."*
- *"Because of this, his nutrition is also affected, as he cannot take orally well. Whatever he takes, some part of it goes into his windpipe as well. This is very complicated condition. The blood tests are also showing that his nutrition status is poor."*

- *"Your husband had been tried for a nasogastric tube three times, but he was not able to tolerate them and kept pulling them out."*

Q: Doctor, may be because he doesn't want to be fed any more, and that's why he is pulling the tube?

- *"The team is also concerned about your husband's overall nutritional status and there is evidence on his blood tests that he is not getting adequate nutrition orally, which is further exacerbated by his swallowing difficulties."*
- *The team has discussed today in the morning during the ward round that the best way to supplement the feeding is by a PEG tube .... Do you want me to tell what is PEG tube? ... with PEG tube, the feeding will be done through a tube into the stomach through the tummy wall rather than by mouth."*
- *"What do you think that your husband would have expressed his views if he had the capacity to make his own decision? .... Ok, I will check with your husband as well by using all means possible to make the information understandable to him."*

▶ Help & Explain (Body of skill)

Q: No doctor I don't want my husband to have the PEG tube?

- *"Ok, whether your husband has made any advance directives or appointed any LPA who could make healthcare decisions on his behalf?"*

Q: Can I stop this procedure being done?

- *"I appreciate your concerns. Could you tell me the reasons why you don't want the insertion of PEG tube for your husband? ...... If an adult in the UK does not have the capacity to consent to, or refuse, a treatment, the responsibility lies with the consultant in charge to make the decision, and this decision is done in the patient's best interest. Family members can voice their opinion but cannot sign the consent form or decline treatment on their relative's behalf. However, whatever you think, that is important for us and we respect it, but the final decision rests with the consultant in charge."*
- *"You can discuss the matter with the other family members. I can arrange your meeting with the consultant in charge, so that you can discuss the matter with him as well. I will involve the medico-legal team as well."*
- *"Do you have any other concerns or any other questions?"*

▶ Referrals

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I can understand that you will need more time to think about the issue raised. So, I suggest we meet again so I can answer all your questions."*

- Factors the doctor needs to consider before arriving at a decision on behalf of the patient who lacks capacity:
    - which decision is least restrictive to the patient's future choices?
    - what are the patient's beliefs and wishes, as interpreted by the healthcare team?
    - opinion of the patient's family members or others close to them with regard to what they understand of the patient's values/beliefs/wishes as well as what they themselves feel would be in the patient's best interests. Family members do not have the overall final say but their views should be considered seriously
    - If the patient previously has expressed any preferences such as in the form of an advance directive or appointed any LPA.
    - If the patient has appointed any LPA. Doctor is not bound to follow the wishes of LPA. Because the final decision rests with the clinician in charge who is seeing the patient. But if still there is a dispute, don't take the decision independently. Always ask the consultant, get a second opinion, and involve medico-legal team or the Court of Protection.

40. Care of the vulnerable adult

Your role:	You are the doctor in the medical admissions unit
Problem:	Discussing care & PEG tube insertion in a vulnerable adult
Patient:	Simra Rahat, 21 years old
Relative:	Mr. Komail Rahat, patient's father, next of kin and guardian

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This 21-year-old woman has cerebral palsy, severe learning difficulties and epilepsy since childhood. She has a bad curvature of her spine (scoliosis) which contributes to poor respiratory function, and to her feeding difficulties. She is currently PEG fed. She has no verbal communication. She lives at home with her father who has been providing all care for her since her mother left the family 3 years ago. She has been admitted to hospital today with a 3-day history of vomiting and diarrhea for which she needs to be treated with IV fluids. However, she seems to be resisting all attempts by medical and nursing staff to insert an IV cannula to give her the supplemental fluids.

Your task: to speak to patient's father about the reason for her admission, the need to treat her with IV fluids and to address any other concerns he might have.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the medical admission unit. Are you Mr __________, the father of Mrs. ___________? Well, nice to meet you sir."*

▶ Agenda setting

- *"Well, I am here to discuss with you about the condition of your daughter. Is that correct? Ok."*

▶ Tell

- *"What do you understand about the reason for your daughter's admission to hospital? .... As I want to go through this and want to discuss the management options with you."*
- *"Do you want me to tell about the condition of your daughter? ...... Her vomiting and diarrhoea are likely to be due to a 'stomach bug she may have picked up' (gastroenteritis) and her other health conditions make her more vulnerable to this."*

▶ Help & Explain (Body of skill)

- *"There may be other causes for the feeling sick (vomiting) or bringing up of her feeds (regurgitation) like increasing swallowing difficulty. I have a checklist of questions I need to ask as a matter of routine, is that OK? Although feeding through PEG tube only would reduce the chances of bringing up of food (dysphagia & regurgitation) but can you tell me whether she has been taking anything by mouth? In what posture she remains most of the time, as her position could equally affect her ability to swallow secretions."*

Q: It is virtually impossible to get needles into her as she always reacts violently. Although, I appreciates what you are trying to do, it really isn't feasible. Can you not just leave her alone?

- *"I appreciate your concerns about her, but her blood tests show that she is dehydrated, likely due to the diarrhoea and feeling sick, which requires treatment with IV fluids. These can also affect her ability to keep down her anti-epilepsy tablets."*
- *"Do you have any idea of IV medications and fluids? ..... Do you want me to explain anything or refresh your memory?"*
- *"Could you tell me why you don't want this to be done for her?"*

Q: Doctor, can't you see that she is in so much pain every time you try and insert the drip into her?

- *"I appreciate your concerns, but doctors will apply anaesthetic cream on the skin (Amitope cream) and she will not feel any pain."*

Q: I have been looking after my daughter all these years – I think I am the best person to judge whether she needs to stay in hospital or not!

- *"I can understand your concerns for your daughter, but you cannot decline treatment on her behalf when it is clinically judged to be in her best interest. However, we respect your opinions about her, and will address your concerns as far as possible."*

Q: Doctor, can I to talk to someone else for second opinion?

- *"Ok, I will book your appointment with my consultant for a second opinion so that your concerns regarding further treatment could be addressed. I will also involve the learning disability team and home care services to get their support as they will understand your worries."*

Q: It's difficult for me to care my daughter on my own, especially feeding issues?

- *"I can understand that it must be very difficult for you to look after your daughter on your own and you need plenty of support, but it does not mean that you are not looking after her properly."*
- *"However, the hospital staff is concerned for her currently required medical treatment .... And also, because she needs full care with appropriate equipment, along with advices for her proper handling."*
- *"The priority of the staff in the hospital is to ensure her safety and welfare, as well as to support her as the carer."*
- *"If you have thought of getting outside help? ......Ok."*
- *"What type of, and how much, extra help you need? Do you know the agencies which could best help you with that?"*
- *"The hospital can help you with regard to finding this out and in contacting the learning disability co-ordinator, social worker, and the occupational therapist before her discharge. There will be also a multidisciplinary meetings before her discharge, which will involve you, to explore the current situation and the care that your daughter requires. This will allow the staff to plan properly for a suitable package of care when she is ready to go home again."*
- *"Do you have any questions or concerns which have not been addressed so far? I am going to book another appointment so that you can speak with me along with my other colleagues."*
- *"I need to discuss my concerns regarding the safety and care of your daughter as a vulnerable adult with my consultant, ward manager, duty social worker and colleagues. I also need to document my concerns and the details of my meeting with you clearly in the patient's notes."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Referrals

▶ Recall and follow ups with contact details

Vulnerable adult

- Someone >18 years who is at risk of harm or exploitation due to their older age, a mental health problem (including dementia), a physical or learning disability or any other long term condition.
- The harm or exploitation may be physical, sexual or psychological abuse, financial exploitation (theft, fraud, misappropriation of property, benefits), neglect or discrimination/harassment. This includes unnecessary investigations or treatment which would not have much perceived benefit.

Duties of healthcare professionals to safeguard vulnerable adults

- **Empowerment:** it should be presumed to have capacity to make own decisions until proven otherwise
- **Protection:** consider what support or representation is needed to ensure his/her protection
- **Prevention:** preventing harm or abuse (including neglect or other types of abuse which may occur within health services) should be the primary aim
- **Proportionality:** the response to harm and abuse should be proportional to the perceived risk of harm and be least restrictive of the person's rights and wishes
- **Partnership:** any action taken should be in partnership with the patient, those close to or caring for them and with multiagencies in the community
- **Accountability:** all persons or agencies should be accountable and transparent in their role in caring for these patients.

41. Blood transfusion for a Jehovah's Witness

Your role:	You are the doctor on call
Problem:	Discussing blood transfusion with a Jehovah's Witness in life saving situation
Patient:	Mr. Rehan Masih, 61-year-old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient has decompensated chronic liver disease due to haemochromatosis, and he has been admitted because of numerous episodes of melena over the last 10 days and feeling generally unwell. A clinic blood sample revealed a hemoglobin of 5.0 g/dL. The biggest concern for the consultant is a possible life-threatening hemorrhage in the presence of the anemia. He has asked you to crossmatch the patient for 5 units and to put him on the endoscopy list for suspected esophageal varices. However, the patient tells you that he follows Jehovah's Witness faith and does not wish to have a blood transfusion due to his faith and strong views against it. Although, he acknowledges that death may result if he does have a massive bleed.

Your task: to explain clearly the nature and seriousness of his current illness, explain why a blood transfusion is in his best interests whilst considering his religious views and discuss any possible alternatives to blood transfusion.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor on call. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having some liver disease and you have lost the blood. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your condition and what we can do further. Is that ok? So, before I proceed further, I will like to ask you whether you need any relative or any friend or any religious adviser to be with us during this discussion. ...... Ok. So, will you tell me, how are you feeling now?"*

  (Interview the patient in the presence of a witness like a friend or relative or religious adviser. Jehovah's Witnesses can provide counsellors at short notice if you apply to a local congregation)

▶ Tell

- *"Do you want me to tell what happened to you and what you are having? ...... "*

Q: Tell me about it, doctor?

- *"I understand that your current problem is due to chronic liver disease caused by the condition called haemochromatosis. This condition causes scaring and shrinkage of liver, which results increased pressure in the blood channels of liver and bowel. This increased pressure in blood channels causes the blood channels to swell and enlarge, and finally they may rupture causing massive bleeding from the gullet and stomach. The continuous loss of blood has resulted in your low blood counts due to which you feel unwell."*
- *"Do you want me to tell you, how we can manage it?"*

Q: Ok doctor, how will you manage it?

- *"The best and most efficient way of treatment for the low blood count is blood transfusion."*
- *"How do you feel about a blood transfusion?"*

▶ Help & Explain (Body of skill)

Q: I knew you would ask me about a blood transfusion – that is why I did not want to come into hospital!

- *"You are at risk of dying without a blood transfusion, if you have a further large bleed from your bowels in the presence of such a low blood count. However, there could be some risks of blood transfusion as well."*
- *"But if you consent against the blood transfusion, we will respect your wishes, and we will do as you will say ……. Can you give me the list of procedures which you don't consent for? Will you tell me the precise nature of restrictions which are upon you?"*

Q: Why can't you respect my wish not to have a blood transfusion? It is my religious belief and I feel strongly about it!

- *"I can understand your condition and appreciate your concerns, and we will respect your decision, and your decision does not take away your right to reasonable and proper care. As a doctor we will give you the best possible care other than blood transfusion, including possibility of giving other alternative treatment as well."*
- *"I will inform my consultant and will also inform the blood team (haematology team) and will also involve the medico-legal team."*
- *"Legally, a mentally competent person has absolute right to refuse or agree to medical treatment for any reason, rational or irrational, or for no reason at all, even where the decision may lead to his own death. He has this right even if others, including doctors, believe that the refusal is neither reasonable nor in his best interests. It can be either in person or through an advance directive."*
- *"Whether your refusal to treatment is due to any pressure from any relative or any other person? …. As your consent or refusal could not be said to be voluntary in these situations."* ***(Document all what has been discussed)***

Q: Are there any alternatives to blood transfusion?

- *"The other possible treatment options include recombinant erythropoietin, intravenous iron infusion and nutritional support, e.g. folate and vitamin B12."*

  These Jehovah Witnesses themselves have good knowledge of alternative therapies and many areas have Hospital Liaison Committees who work well with clinicians who are receptive to different ways of thinking and working.

▶ Referrals

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- Jehovah's Witnesses don't accept blood transfusion due to their religious believes. However, they don't absolutely prohibit the use of blood components such as albumin, immunoglobulins and haemophilia preparations, and each Witness can decide individually if he wishes to accept these or not.
- These Witnesses believe that blood removed from the body should be disposed of. They do not accept auto-transfusion of predeposited blood. So, the techniques like haemodilution or blood storage are objectionable to them. However, some Witnesses may agree to them, if they believe that it does not violate God's commandment. So, it's the doctor responsibility to consult individual patient and discuss all options, always involve the team, and don't decide individually by own. Also ensure that it will be kept confidential because some of Jehovah's Witness may want to take the blood transfusion, but they are scared that it may lead to dissociation from the religion and from their congregation. So, assure them that it would be kept confidential, and only the doctor, the caring staff and nursing staff will know it, and will not be told to anybody.

42. Postponement of an investigation

Your role:	You are the doctor in a respiratory team
Problem:	Dealing with the issue of postponement of fine needle percutaneous lung biopsy in a suspected lung cancer patient
Patient:	Mr. Muhammad Khubaib, 65 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient has a solitary lung shadow. Being an ex-smoker, the consultant radiologist wants to rule out a neoplastic lesion by doing FNAC, and he was given appointment for that. However, as he was being treated for DVT, the consultant advised him to stop warfarin 48 hours before the biopsy, to have his clotting checked on the day of the biopsy and only to proceed for biopsy if INR would be less than 1.5. Unfortunately, he has not stopped the warfarin, because the instructions from the consultant were not clear. So, the radiologist has refused to proceed with the biopsy. The patient is unhappy due to it, as he is worried that lung shadow might be a cancer. He is concerned because he may have to wait too long for another biopsy appointment.

Your task: to explain that it would be unsafe for him to have his biopsy carried out today and to come to some compromise.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in lung clinic. Are you Mr. _________? Well, nice to meet you sir."*

▶ Agenda setting

- *"Well, I understand that you were having some lung shadow and you are here for biopsy to be done in the clinic, and as well as you were having some blood clots in the blood channels of your legs (DVT) and you were put on blood thinning medication (warfarin). Is that correct?"*

▶ Tell

- *"I am very sorry to tell you that the consultant who has to perform the biopsy (radiologist), he has refused to perform the procedure today."* ***(Silence)***

▶ Help & Explain (Body of skill)

- *"Could you tell me the reason for not stopping the blood thinning medication (warfarin)? ...... Whether instructions were not clear, or did you are afraid of developing another blood clot in the blood channels of your legs, or did you forget?"*

Q: Doctor, please carry it today.

- *"I appreciate your concerns and can understand that you are very much worried about your condition, and you are scared as well, but we are also scared because of risk of bleeding if the biopsy is carried out whilst you are on blood thinning medication (warfarin)."*
- *"The warfarin must be stopped for at least 48 hours before the procedure. There will be minimum risk of bleeding if it is stopped 48 hours before the procedure. Usually the blood thinning test (INR) would be checked before the biopsy to ensure that the blood is not too thin. There will be only a minimal risk of developing blood clot in the blood channels of your legs if it is stopped for 48 hours."*

Q: No, no doctor, why did the consultant not give me clear instruction to stop it? Do it today, as you know I might have cancer, and I don't want to wait for long. When you are giving me next appointment?

- *"One thing I remind you that our consultant is still unsure whether your lung shadow is cancer or not, that's why we are planning for the biopsy. I can understand your feelings, and I appreciate your concerns and you don't worry, I will speak to the consultant radiologist who is going to carry out biopsy. Right now, I will call him, and I will try to book another appointment at the earliest possible time. I will give you the date before you leave."*
- *"I again apologize for the inconvenience. Do you have any other queries or grievances about the postponement of the biopsy?"*
- *"How you came here; if you came by ambulance, I will let the ambulance desk know that you will be going home soon."*
- *"I will let my consultant and the histology department know of the postponement and will rearrange the next outpatient appointment to fit around the rearranged biopsy."*

▶ Referrals

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Recall and follow ups with contact details

43. Clinical error in drug administration

Your role:	You are the doctor on call
Problem:	Administration of IV amoxicillin to penicillin allergic patient
Patient:	Mrs. Iram Jehanzeb, 75 years old
Relative:	Mrs. Nasreen, patient's daughter

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient, having dementia, was admitted from a nursing home with left lower lobe pneumonia. One of the accompanying carers conveyed the nursing details to the casualty triage nurse that she is allergic to penicillin. Unfortunately, due to breakdown of communication, this message was not passed to you. As the patient was not able to give a proper history, all the doctor had was a GP's letter which did not state the allergy. Inadvertently IV amoxicillin 1 g (first dose) was given, and she developed a rash and vomiting, which was managed. You crossed off the IV amoxicillin from the chart and wrote in big capital letters in the notes and on the cover 'ALLERGIC TO PENICILLIN'. Her daughter is angry and upset about this incident and wants to make a complaint. You decide to speak to her first.

Your task: to speak to patient's daughter, acknowledge the mistake, listen to her concerns and explain what you will do about the incident.

▶ Greeting

- *"Hello! I am Dr __________________, one of the doctor on call. Are you Mrs. ________, the daughter of Mrs.___________? Ok madam."*
- *"Well, I understand that your mother is admitted to the hospital and she is with us for some lung infection. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your mother's condition, about her treatment which was given to her, and what we can do further? Is that ok? So, before I proceed further, will you tell me that what you know about your mother's condition?"*

▶ Tell

Q: I know that she was having chest infection, but why was she given penicillin when she was allergic to it?

- *"I am very sorry, and I apologize that this incident has occurred." **(Golden silence)***

▶ Help & Explain (Body of skill)

Q: How can such a serious mistake be made by you and your colleagues? My mother is already unwell and did not need to be put through any more suffering.

- *"Actually, we would never have given to her it but there was a breakdown in communication as the message was not conveyed to me, but this should not have happened. I sincerely did not know that she was allergic to penicillin, and this was given in good faith in her best interest in view of your mother's condition as this was the best possible medication for her chest infection."*
- *"The mistake was spotted as soon as she had symptoms and the situation was managed correctly. We were there to manage her, and we treated her with appropriate drugs."*

Q: What systems does the hospital have to make sure such an error does not happen to my mother or other patients in future?

- *"I will inform my consultant about this, and I will report this incident as a 'critical incident' to the risk management team. They will let our hospital managerial staff to know, and the efforts will be made for not to happen it again by better staff awareness and reporting of drug allergies."*
- *"We will write penicillin allergy in large print on the outside of the file of your mother's notes, so that everybody should knew about it."* ***(Document everything and initiate an incident report)***
- *"I again apologize for this error."*

Q: Give me details about how to make an official complaint.

- *"OK, I will give you the name and address of the person and the concerned department."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far .... So that I can add which might you miss?"*

▶ Recall

Contents of adverse incident report form

- Date and time of the report
- Date and time of the incident
- Location of the incident
- Type of incident
- Identification of the person affected
- Condition of the person affected
- Identity of person(s) witnessing the event
- Identity of person preparing report
- Identity of person to whom the incident is being reported and what action has been taken
- The factual details of the adverse incident
- Details of any equipment/drug/blood product/vaccine involved including the manufacturer, model and batch number where applicable

A non-punitive reporting system

- Assure staff that the reporting system will not be used for disciplinary action, to encourage them to report these incidents. This should be for prevention, educational purposes at meeting and improving systems; and will lead to a more open and blame-free culture.

Legal aspects of the report form

- Legally, if a clinical negligence is claimed then the incident report would have to be disclosed as evidence. Therefore, ensure that the details of an incident are only pure factual events and not the opinion.

44. Fitness to drive

Your role:	You are the doctor in a general medical clinic
Problem:	Dealing with the issue of driving after a single seizure
Patient:	Mr. Fayyaz Minhas, 35 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient has come in the clinic today for review after a solitary fit, which he had 4 weeks ago followed by a brief hospitalization. His EEG and CT scan of the head were both normal, and there were no precipitating factors. He works for British Telecom (BT) as a maintenance technician requiring lot of driving to rectify the faults. On discharge, he was advised not to drive for a year, being barred legally, and have a medical review before restarting driving. But he feels himself well, and due to the risk of losing his job, he has decided to go back to full-time work. He has not yet considered a placement elsewhere within BT.

Your task: to determine if the patient has any more fits and discuss the issue of driving

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the medical clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having some fits and, you were admitted to us and investigations were done for you. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your medical condition and the issue of driving, whether you can drive or not. Is that Ok? So, before I proceed further, would you tell me that how are you feeling now?"*

▶ Tell

Q: My tests were normal, so how can I believe that I should not drive for a year, as mentioned to me on discharge from the hospital.

- *"Yes, I agree with you that your tests were normal, and that's the good news. But there is no doubt that you did have a fit. **(silence)** Had you any more fits? Will you tell me that how you are feeling now?"*

▶ Help & Explain (Body of skill)

- *"Are you back to your work? Whether you have started driving?"*
- *"Can you tell me about your occupation? Does it require driving?"*

Q: Yes doctor, as I consider myself quite well, so I have started driving.

- *"There is no doubt that you had a single fit (solitary fit), and as I explained you before, but it is by the DVLA that you are legally barred from driving for 1 year, unless again to be reviewed by the medical team to determine whether you can commence the driving or not. However, there are some situations in which the DVLA can allow after 6 months ...... (Provided that you had a satisfactory assessment by a brain specialist and the CT head and EEG have come back as normal)."*

Q: How can I get around without driving, as this is essential for my work, and my livelihood depends on it!

- *"I can understand, and I can appreciate your concerns, but the thing is that the life is more important. If you will keep on driving, then yours and other's life will be in danger."*

- *You must inform the DVLA, and according to DVLA, you cannot drive until you fulfil the DVLA guidelines."*

Q: But I'm fit, and this was only one small alcohol related fit.

- *"I appreciate your concerns, but DVLA does not accept alcohol as an excuse for a solitary fit."*
- *"Whether you notify the DVLA or not, your insurance policy is now invalid."* ***(silence)***

Q: I can understand your concerns, but I can't stop driving.

- *"If you will not inform the DVLA then I am in a position to inform the DVLA, and I will write it as well."*
- *"You can speak to your manager and to your employer for placement to some other job in which you don't require driving."*

Ok, I will speak to the BT management.

▶ Referrals

- *"I will arrange your meeting with my consultant if you still wants to drive, and he will be in a better position to advise you to comply with DVLA guidelines."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- *"We can make a next appointment in a few days, so that we can discuss the matter again."*

Driving restrictions (UK DVLA guidelines)

Disease	Private vehicle licence	HGV / PSV license
Fits		
First unprovoked seizure while awake **(with a low recurrence rate < 2%/year)**	**6 months** (fit free/ after medical review) **6 months** during treatment changes	**5 years** (Fit free/after medical review)
Epilepsy with seizures while awake **(2 or more seizures)**	**1 year** (fit free/after medical review)	**10 years** (fit free off medication & risk of recurrence < 2%/year)
Seizures while asleep and awake	**3 years**	
Seizures while asleep	**1 year**	
Seizures not affecting consciousness or driving	**1 year**	
ACS	**1 month** if untreated **1 week** if treated with stent and normal LV	**6 weeks** if symptom free and no inducible ischaemia on ETT
Stroke/TIA	**1 month** if no persistent deficit	**1 year** if no persistent deficit
IDDM	**Notify DVLA** may drive if no visual impairment and aware of hypoglycaemia	**Banned**
OSA		
Suspected: having excessive sleepiness & adverse effect on driving	Stop driving but do not notify DVLA until diagnosis confirmed.	
Diagnosed: without excessive sleepiness or adverse effect on driving	No need to notify DVLA and continue to drive as normal.	
Diagnosed: having excessive sleepiness or adverse effect on driving	Stop driving and must notify the DVLA in writing rather than by email or phone. The treatment for OSA is very effective if used correctly. So by the time the DVLA paperwork is to be completed, the driver has already been treated with resolution of symptoms. In this case, the DVLA should not revoke license.	

- A series of fits in 24 hours constitutes one episode.
- Informing the patient about driving restrictions is the physician's responsibility while informing the DVLA is the legal responsibility of license holder by filling out 'Declaration of Surrender for Medical Reasons' form. DVLA can reissue the licence following the stipulated period if cleared from patient's medical practitioner. If patient is still driving, the physician should once again remind the patient that he/she should not be doing so and that he/she is legally bound to inform the DVLA. This should be clearly documented in the notes. If physician finds out that the patient is continuing to drive despite repeated warnings, inform the medical adviser at the DVLA but patient should be told first that DVLA is being informed.
- Physicians should also let the patient know that their insurance is invalid until the change in their medical status has been reported by them and is on their motor insurance record.

45. Limits of treatment in end-stage disease

Your role:	You are the doctor on call
Problem:	Discussing limits of treatment in a seriously ill COPD patient
Patient:	Mr. Yamin Khan, 75 years old retired welder
Relative:	Mr. Salman Khan, patient's eldest son and next of kin

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient, who has a long-standing COPD, has been brought to A&E department with breathlessness, drowsiness and confusion. He has pneumonia and has been treated with oral erythromycin for the last 6 days by the GP. Now the GP has referred him to the hospital because his condition is deteriorating. His ABGs has been done which revealed that urgent intervention is needed, like intubation. But his detailed previous history is not available. The GP has written a letter to intensivist that he needs intubation, but the intensivist feels that intubation and ventilation is inappropriate because of his established COPD. You tell the senior nurse looking after him that you are going to talk to patient's eldest son, who is waiting in the visitor's room, to obtain more information regarding overall quality of patient's life.

Your task: to inform the son how serious his father's illness is, get an idea of the father's general pre-morbid condition, and obtain information to inform the discussion around ventilation.

▶ Greeting

- *"Hello! I am Dr ________________, one of the doctor on call. Are you Mr ________, the son of Mr__________? Ok."* **(No good morning or nice to meet you)**
- *"Well, I understand that your father is admitted to the hospital with some chest infection and he was given some treatment before also. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the condition of your father and what we can do further. Is that Ok? Before I proceed further, will you tell me that how much you know about your father's condition?* ***OR*** *Do you want me to explain about your father's condition?"*

▶ Tell

- *"Your father is with us with some chest infection and his condition is becoming very serious, and we have to make decision about his management very quickly that what we should do."* **(Silence)**
- *"Your father may not survive."* **(Silence)**

Q: Is there any way out, doctor?

- *"The only option is to artificially support his breathing system by a machine (ventilator), and that would mean that he will be treated in the intensive care unit (ICU)."* **(Silence)**

▶ Help & Explain (Body of skill)

- *"Would you like to tell me that what was your father's normal state before this chest infection? ..... How much he could walk before being breathless? Any effect on his social life? What was his general quality of life? What treatment regimens he was taking (nebulizers, home oxygen cylinder or long-term oxygen therapy* *machine)? Any previous illnesses? What was his response to treatment? Had he any previous admissions to ICU? Any previous requirement of artificial breathing support? How long remained on artificial breathing machine? Any difficulty in removing off from it? Does he required putting a pipe through his neck into his wind pipe (tracheostomy)?"* ***(severity of the COPD & quality of life)***

- *"The ventilation in the ICU means that a tube is passed into the windpipe and it is connected to a machine which will rest the lungs whilst treatment is being given. There will be tubes in the arm and neck to give medicine and fluids."*

Q: So much tubes will be passed to my father, will not they hurt him?

- *"He will be unaware, because he will be sleeping during this period with the medication."*

Q: Will my father die if he is not placed on this ventilator?

- *"Your father may not survive."* ***(Silence)***

Q: What are the risks associated with this ventilation?

- *"There are risks of artificial breathing and ICU like further infection (sepsis), difficulty in removing off the artificial breathing machine and sometimes death."*
- *"Have your father shown any objections to ICU admission and ventilation?"*
- *"How does the other family members feel about this?"*
- *"Do you have any other queries?"*

Q: Me and my other family member want that my father should receive all active treatment.

- *"I appreciate your concerns and I will arrange your meeting with my consultant, and he will be in a better position to answer your question."*

▶ Referrals —

▶ Reassure —

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

46. Withdrawing treatment

Your role:	You are the doctor in an intensive care unit
Problem:	Discussing withdrawal of treatment in a critically ill patient who is not improving despite all active treatment
Patient:	Mr Allah Ditta, 80 years old
Relative:	Mrs. Nabeela, patient's daughter

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient is admitted in the ICU for the last 2 weeks after emergency repair of leaking aortic aneurysm. He is intubated and, is on ventilator and receiving haemodialysis for cardiorespiratory and kidney failure. Despite all active treatment, his condition is not improving and, the surgical and ICU teams have decided to withdraw treatment. The consultant feels this should begin by tailing down the inotropes first, which in consultant's opinion, will probably lead to death within an hour. The patient is well sedated and shows no signs of distress, pain or discomfort. The patient's daughter is waiting in the relatives' room to be briefed on the decision.

Your task: to break the bad news to the daughter regarding patient's condition, explain that the ICU team feel that withdrawing treatment is in the best interests and explain how this will be done.

▶ Greeting

- *"Hello! I am Dr____________________, one of the doctor in the intensive care unit. Are you Mrs. __________, the daughter of Mr______________? Ok."* ***(No good morning or nice to meet you)***
- *"Well, I understand that your father is with us in the hospital, and some operation on his chest was done. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the condition of your father and what we can do further. Is that Ok? Before I proceed further, will you tell me that how much you know about your father's condition?* ***OR*** *What you have been told about your father's condition?"*

▶ Tell

- *"I am very sorry to tell you that your father remained very poorly and despite all efforts he has not improved."* ***(Silence)***
- *"I want to share with you some thoughts about the next step, what we can do now. Despite being on active treatment, the ICU team feels his outlook is poor and he is not responding at all, and he is going to die."* ***(Silence)***
- *"My team feels that continuing active treatment will not achieve the desired result."*

▶ Help & Explain (Body of skill)

- *"Who makes up the family? Whether you or any of your other family members has expressed their views on this matter?"*
- *"Whether you know about any opinion expressed by your father when he was well as to how he would like this situation managed? Does he have any advance directives?"*
- *"Is there any member of the family who is unaware of the situation and must need to be informed?"*

Q: What will happen when you switch off the ventilator? Will he be in pain?

- *"Your father is sleeping with the medications and, he is not in pain and he is not aware of what is happening. If the family agrees to withdraw the treatment, then your father's condition will deteriorate very quickly, and he will die very soon...... He is comfortable and he is not in pain, and he is not aware what is happening."*

Q: Don't let my father die and continue with the active treatment.

- *"I appreciate your concerns and your feelings as a daughter for your father, but the final decision to withdraw treatment does not lie with you or with your family, but with the intensive care staff. So you must not feel as you are causing the death actively, because the final decision rests with the team and not with you."*

Q: How the withdrawal will be carried out?

- *"We will stop the medication which are supporting the heart (inotropes) and then the heart will stop. Then we will stop the machine for breathing, and the other machines like haemodialysis machine."*

Q: How much time it will take to ......?

- *"We don't know the exact time, but I can give you rough estimate that he will deteriorate quickly within minutes or within hours. Your father will be comfortable and free from pain and distress while his heart will probably slow down and stop."*
- *"Withdrawing treatment is a hard and emotive decision for the staff as well, and it's not an easy decision."*
- *"This decision is not needed right away now, and you should speak to the other family members. You can see me again in the later part of the day."*
- *"Do you have any other queries, questions or any concerns?"*
- *"Sister! Do you have anything to add to the discussion?"* ***(ask the ward sister participating in the discussion)***

Q: Me and my other family member want that my father should receive all active treatment.

- *"I appreciate your concerns and I will arrange your meeting with my consultant, and he will be in a better position to answer your question."*

▶ Referrals —

▶ Reassure —

- *"Your father is not in pain and the final decision rests with the team. You or the family don't need to feel guilty because you are not letting your father die, but this decision is made in the best interest of your father."*

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall –

- "If the treatment is possibly benefiting the patient then it should not be stopped, unless the competent patient has refused the treatment at that time, or in advance directives.
- If the treatment is not beneficial and only prolonging suffering, it may be hard to stop if found to be ineffective. This difficulty can be avoided by specifying time-limited goals, discussing with the patient (if possible), the relatives and with the clinical team. However, there is no absolute right to a treatment that a responsible professional opinion considers as inappropriate.
- If there is no chance of recovery in patient who are unconscious or in vegetative state and treatment have no benefit other than prolonging life, but withdrawal of treatment like tube feeding is just like 'starving to death', or distressing them by thirst, then nothing should be done that could add to their discomfort.
- Avoid painful, invasive procedures or drugs that have unpleasant side-effects, if they have no benefit to the patient.
- Effective palliation, which is distinct from life-prolonging treatment, should never be withdrawn.
- It is unethical to deny a patient access to treatment or withdraw treatment in order to make treatment available to another individual.
- There is no requirement for doctors to obey a request for any particular treatment, but they are under an obligation to withhold or withdraw treatment if that is the competent patient's expressed desire given at the time of treatment or, if incompetent, given as a valid advance refusal, even though the doctor may disagree.

47. Unrelated live donor transplant

Your role:	You are the doctor in the diabetes clinic
Problem:	Discussing the risks and benefits of unrelated kidney donation
Patient:	Mr Saqib Alvi, 42 years old
Relative:	Mrs. Alvi, patient's wife

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.
Where relevant, assume you have the patient's consent to discuss their condition with the relative/surrogate.

Scenario:

This patient with type 1 diabetes mellitus have diabetic nephropathy and is now on renal transplant list for 4 years. He is stable on haemodialysis but concerned that he may never find a donor. His wife has read from newspaper that unrelated donations are successful now a days. She is genetically unrelated but for the sake of her husband, is now considering whether or not to donate one of her kidneys. She has come to see you for more advice regarding the risks to her and to her husband from this donation.

Your task: to discuss the pro and cons of live organ donation with Mrs. Bowman.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the diabetic clinic. Are you Mrs. _________, the wife of Mr________________? Well, nice to meet you madam."*
- *"Well, I understand that your husband is having diabetes and he is on kidney transplant list. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about kidney donation and what we can do further. Is that ok? Before I proceed further, will you tell me that what do you know about kidney transplant? ...... it is better that your husband is also here."* ***(Better to conduct this skill in the presence of both husband and wife)***

▶ Tell --

▶ Help & Explain (Body of skill)

Q: I have started losing hope that he'll ever be given a new kidney from waiting list because we have been waiting for last 4 years?

- *"I can appreciate your concerns for your husband. However, while the patient is on the organ waiting list, it is difficult to know when a suitable organ will be available."*

Q: I have read that unrelated donations are successful now a days?

- *"Live organ donation has a better outcome than cadaveric donation. The matching will be assessed, but the matching may not need to be perfect and it is not vital that the donor should be a close relative of the receiver due to advances in the medications which are given after transplant (immunosuppression)."*

Q: What are the advantages of live non-related organ donation?

- *"We will remove your husband from the waiting list. He will not be in the need for the continued dialysis and it will also minimize his deteriorating health. Of course, he will have a new kidney and, he can live better and can do better."*
- *"Kidney from live donors, if like you are donating, then it does not need to be transported from one site to another. So, the kidney is in a better condition when it is transplanted."*

- *"You will also get psychological satisfaction after helping your husband in this way."*

Q: Are there any risks or disadvantages to me or my husband if I give him one of my kidneys?

- *"Yes, there are risks which may be before operation, during operation and after operation. There is also a minimal chance that you will develop high blood pressure."*
- *"Kidney donation is a major operation and you have to stay in the hospital for about a week and may be a few weeks after the operation to have full recovery."*
- *"Psychologically, you may feel that you are left with only one kidney and you have to spend your all life with one kidney. Although many patients are doing very well with one kidney but this psychological impact you might have."*
- *"Mrs. Bowman! Before operation, you will undergo many assessments like compatibility tests, screening for diseases which may reveal a disease like hepatitis B or any other conditions in you which could have psychological and medical implications."*
- *"You have to take off from the work and you can lose your earning."*
- *"Mrs. Bowman! You should also check the implications of an organ donation with your insurance agency as well."*
- *"There is possibility of transplant rejection as well."*
- *"The recipient has to be on life-long medication to prevent rejection which may increase the risk of serious infections."*
- *"I hope no third-party interests are involved like any payment for the organ to be donated."*
- *"If you decide to go ahead if you both agree, then both of you will be assessed by a transplant team."*
- *"I would like to say thank you for your time."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"Take time to think, and we can meet again soon as it is a quite sensitive matter. You can also talk to me on this contact number if you need further advice."*

Criteria to be fulfilled before live donor kidney transplantation:

- the risk to the donor must be low
- the donor must be fully informed
- the consent must be fully and freely given
- the donor must understand that he/she is entitled to withdraw consent at any time before the operation
- the offer of the organ must be totally voluntary
- the transplant procedure must have a good chance of a successful outcome for the recipient
- An independent assessor must have conducted separate interviews with the donor and recipient and submitted a satisfactory report to the HTA.

G. DEALING WITH DIFFICULT PATIENTS/RELATIVES

- A patient desperate for a diagnosis
- A missed tumor
- An unhappy inpatient
- Delay in investigation
- A patient wanting to self-discharge

48. A patient desperate for a diagnosis

Your role:	You are the doctor in the general medical clinic
Problem:	Explaining chronic fatigue syndrome to a frustrated patient evaluated by several specialist but no one could make any diagnosis even after extensive investigations
Patient:	Miss Salma Agha, 35 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient has a 4-year history of lethargy, muscle aches, joint aches and headaches. She also thinks that she has become more vulnerable for picking up infections. Her symptoms are so severe on some days that she is unable to get out of bed, and at other times she feels shattered for days even after minimal amount of housework. She previously had recurrent abdominal pains and dysmenorrhea, which was diagnosed as endometriosis and managed with three laparoscopic surgeries. She thinks that her last surgery 4 years ago has worsened her symptoms. She has been evaluated by several specialists including rheumatologist, a neurologist and a psychiatrist, but all tests have come out to be normal, and no one was able to find out any cause. So, no appropriate treatment could have been started yet. She is quite upset as she has not improved and have lost much trust in the doctors. Now the GP has referred her to you, thinking the diagnosis of chronic fatigue syndrome.

Your task: to explain to the patient the likely diagnosis of chronic fatigue syndrome and address her concerns.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the medical clinic. Are you Miss _________? Well, nice to meet you madam."*
- *"Well, I understand that you are having some tiredness and pains in your body, and you went to the GP as well. Is that correct?*

▶ Agenda setting

- *"Well, I am here to discuss with you about the possible diagnosis for your symptoms and what we can do further. Is that ok? Before I proceed further, will you tell me that is there anyone who has accompanied you to the clinic whom you would like to be present during the consultation? ..... So how are you feeling now and how much your symptoms have affected your life?"* ***(Silence)***

▶ Tell

- *"I can appreciate how this has really affected your life. I can understand your situation, it must be very upsetting for you especially if you're having difficulty getting out of the house."*

Q: I have gone frustrated as I don't have any diagnosis so far despite numerous investigations?

- *"I can understand that it must be frustrating to not have a satisfactory diagnosis. I assure you that I will do my best to try and help."*

Q: So, what do you think is actually wrong with me?

- *"I have seen all the investigations. It is a good news that all the investigations came out to be normal. As I have seen the history, I could not find any reversible cause of your symptoms which requires treatment. So* *now I and the GP are leaning towards a diagnosis of chronic fatigue syndrome (CFS or myalgic encephalomyelitis or ME)." **(Silence)***

▶ Help & Explain (Body of skill)

- *"Have you ever heard of it? Do you want me to tell you about it?"*

Q: I am aware about this condition 'which doctors think is all in the patient's mind'. So, tell me what causes it, how I got it?

- *"Your symptoms are real and it's not like that there may not be a cause for your symptoms. CFS is a disease in which patient can have long-term tiredness and other symptoms such as muscle pain, joint pain, poor sleep pattern, poor memory, inability to concentrate, and they may exist to a variable degree. The exact cause is not known for your disease, but possibilities could include any bug or sometimes it runs in families and sometimes any recent sad incident in the life can cause it."*
- *"I can give you a chronic fatigue syndrome questionnaire. On that all questions are written about it, and if you can fill it, we will know how severe your disease is."*

Q: I need my life back, how can you manage it?

- *"There is no easy treatment to 'cure' CFS completely. But there are various interventions which are helpful to improve patient's quality of life as well as their symptoms. We may ask you to adopt some exercises in your daily routine (graded exercise therapy) or may advise you some behavioural therapy as well (clinical psychological management with cognitive behavioural therapy -- CBT) and also adopting some daily activities with the help of occupational therapist."*
- *"Do you have any other questions, or any particular worries or concerns at the moment?"*
- *"I would like to say thank you for your time."*

▶ Referrals --

- *"I am also giving you information leaflets about chronic fatigue syndrome to take home. You can find out more information about it from website or self-help groups on the internet as well."*

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I will be in touch with you again soon in the clinic."*
- *"You can also talk to me on this contact number if you need further advice."*

Chronic Diseases which can be asked in the exam:

- CFS/ME
- Fibromyalgia
- Irritable bowel syndrome

49. A missed tumor

Your role:	You are the doctor in the neurology clinic
Problem:	Dealing with delayed diagnosis of meningioma and complaint launching
Patient:	Mrs. Tahira Mamon, 45 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient had low-grade benign meningioma which was resected 6 months ago. Her symptoms started 2 years ago when she developed recurrent headache, and the GP diagnosed her as having migraines. However, once she recurrently visited to her GP due to persistent and recurrent symptoms and insisted for further investigations then the GP requested a CT scan about 9 months ago. A suspicious lesion was found at the surface of her frontal cortex, diagnosed subsequently as meningioma which was completely resected by the neurosurgeons. She has come to the clinic for 6 monthly follow up and would like to take an advice from you today that she wants to take legal action against the GP as she feels he did not pick up the diagnosis earlier.

Your task: to assess patient's recovery after resection of her meningioma and address her questions regarding the delayed diagnosis by her GP.

▶ Greeting

- *"Hello! Good morning. I am Dr __________________, one of the doctor in the brain clinic. Are you Mrs. _________? Well, nice to meet you madam."*
- *"Well, I understand that you have been operated and given treatment, and the tests are showing that you recovered completely. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your clinical condition that how you feel now after the operation and what we can do further. Is that ok? Before I proceed further, will you tell me that how are you feeling now after operation?"* ***(Silence)***

▶ Tell

- *"Do you have any symptoms after the operation like persistent headaches, seizures, visual symptoms, and weakness of the face/upper or lower limbs?"* ***(symptoms of recurrence or incomplete resection of the tumour)***
- *"The doctors who did operation on your brain (neurosurgeons) were confident that the mass was removed completely and, the piece taken from your brain (biopsy) and scan of your brain (MRI scan) done after the operation also suggested that.* ***(Silence)*** *Therefore, it is unlikely that you will need any further treatment like radiation or anything else, but we will keep you under close observation. You will have yearly scan of your brain (MRI) for first 5 years."*
- *"How you feel about it?"*

▶ Help & Explain (Body of skill)

Q: Why didn't my GP send me for investigations 2 years ago and did not pick up the diagnosis earlier. I want your opinion on it as he failed in his duty of care. I am considering to take the matter further.

- *"Will you tell me the sequence of events like when first you presented to GP, what was the symptoms, and what was done at that time ...."*

  (Don't blame your colleague, because it is unprofessional and unethical, unless you have been fully conversant with all the facts and documentation)

- *"If you choose to seek legal advice then an expert opinion will be sought to establish that the GP was failed in his duty of care."*

Q: I want to complain?

- *"Before officially putting the complaint, I can arrange your meeting with my consultant and with the doctor who performed the operation for your brain. They will be in a better position to assess what GP did, what diagnosis he was making for the last 9 months and what treatment he was giving you."*
- *"It is also beneficial, because if you are going to involve the solicitor, he will also do the same. So, in this way you can cut down this long-term process and you can meet the consultant and the brain surgeon at the first opportunity. Is that ok."*
- *"If you want to complaint like in this process, you have to write a letter to the practice manager at her GP surgery with details of what had happened previously. There are systems to deal with the complaint internally at GP surgery and then at the level of the primary care trust or higher authorities if required."*
- *"I am giving you the contact details of the Patient Advisory Liaison Service (PALS) also who can give you more information about the NHS complaints procedure – they have office in the hospital."*
- *"Your complaint will be taken very seriously by the relevant authorities and you would expect to receive a formal response from them within 28 working days."*

***Q:* I am still not satisfied, and I want to take legal action.**

- *"Ok, still if you want to contact solicitor, the PALS can give better advice on that. In the absence of a PALS team, the local Community Health Council can do that."*
- *"Do you have any other questions?"*
- *"I would like to say thank you for your time."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I will be in touch with you again soon in the clinic."*

- Poor communication and failure to explain the patients well by the doctors is the most common reason for complains. So, when the patient has come to you, you have the chance to talk and resolve the issue.
- Criticizing or blaming the colleague is unethical unless if you know that there is an obvious error.

NHS complaints procedure

- **Local resolution:** Complaint be attempted to resolve locally by the practice manager and/or the GP(s) involved. If unsuccessful, the complaint may then be escalated to the PCT complaints manager.
- **By the NHS trust or primary care trust:**
    - The complaint may be verbal or in writing. If complaint is given verbally, the NHS trust should put the complainant's points down in writing and a record should be provided to the complainant.
    - Acknowledgement receipt of a complaint should be provided to the complainant within 3 days.
    - The complaints manager within the trust will then go through the case in more detail, obtain statements from the staff members involved and provide a clear and complete response to the complainant within a reasonable number of days as per trust policy (usually 28 working days).
- **Patient Advice and Liaison Service (PALS):** An independent service available in most PCTs and NHS hospital trusts. It assist patients and relatives by addressing immediate concerns, arranging meetings with staff and advising them on access to other services (e.g. formal complaints procedure).
- **Independent Complaints Advocacy Service (ICAS):** This is also an independent body which can help patients/relatives in making their complaint or can provide ongoing support whilst it is being resolved.

Parliamentary and Health Service Ombudsman (PHSO) – this is an independent body.

50. An unhappy inpatient

Your role:	You are the doctor on call during a weekend shift
Problem:	Dealing with a patient who is unhappy about slow procedure for investigations and due to frequent shifting in the wards
Patient:	Mrs. Nigar Cheema, 25 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This lady was admitted to hospital on Friday afternoon with chest infection and with suspected pulmonary embolism. She had some blood tests, ECG and CXR in the A&E department, and was told that she probably had a chest infection, but a CT scan of the chest would be done to rule out a pulmonary embolism. She was commenced on IV antibiotics along with therapeutic Enoxaparin. She is stable and her symptoms have resolved completely. She is worried about PE as her grandfather died of PE. It is now Sunday evening and 2 days have passed but nothing has been done yet. No doctor has visited her or communicated her anything since after her admission. She has been moved a total of four times from one place to other since admission and the last move was at midnight today which disturbed her sleep. She is extremely upset and very angry about the lack of progress and lack of communication since her admission and about moving her too much. She demands to speak to the doctor. She had also a son at home whom she needs to take care as well.

Your task: to find out the reasons for the patient's concerns and address them in a suitable manner.

▶ Greeting

- *"Hello! I am Dr ________________, one of the doctor on call. Are you Miss _________? Well, nice to meet you madam."*
- *"Well, I understand that you were admitted with some chest infection and being treated for that. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your condition, what we can do further, what's going on and also to address your concerns, as the nurse has told me that you want to talk to me. Is that ok? Before I proceed further, will you tell me that do you have some idea why you were admitted to the hospital? What do you know about your condition? ...."* ***(Silence)***

▶ Tell --

▶ Help & Explain (Body of skill)

Q: I was admitted on Friday, but no doctor has communicated anything to me, and it has added to my frustration?

- *"I can appreciate your concerns. I can understand that it can be very difficult for anyone, and I am sorry that nobody has communicated to you. I apologize that you have not been reviewed by the doctor for the last 2 days, but the thing is that the system is slightly different on the weekends. There are only a small number of doctors on duty who attend to the new admissions and very seriously ill patients first."*

- *"But all patients who are admitted to us in the ward and who require frequent check-ups or visits, they will be seen without any delay regardless of whatever is the part of the day or the day of the week. There are systems in place by which doctors are being kept informed. The nurses keep on checking all patients' observations every 6 hours or more frequently, if there is any problem, they inform the doctors immediately and immediately the doctor goes to see that serious patients. The handovers are also done properly between the day teams and weekend on-call doctors so that all the tasks and issues related to patients are communicated properly to the next team on duty."*
- *"Right now, I have seen your notes, you are doing fine, also your symptoms are better and you have improved. However, you are bound to be worried especially if there is a family history of death associated with clot in the blood channel of lung."*

Q: I am told I might have a clot which could kill me and then nobody bothered to send me for a scan to find out!

- *"Now will you allow me to tell your treatment plan. You are admitted to us with chest infection, but we were suspecting some blood clot in the blood channels of your lung as well. You were given treatment for both chest infection as well as for blood clot in the blood channels of your lung."*
- *"Although, it was decided that the scan of your chest will be done but there is reduced radiology staff over the weekend. The earliest the scan could be done was on Monday, unless it was clinically indicated as an emergency. In your case it was not an emergency as you were already being treated for chest infection for which you were admitted and also if it was the blood clot, so already you were put on blood thinning medications thinking of blood clot (heparin)."*
- *"I apologize that this fact was not mentioned to you on the Friday and also you were not informed about the staffing levels and services over the weekend. However, I will highlight this issue with the day team on Monday morning and also ensure that your CT scan will be requested for the next day, if possible. One of your team doctors will let you know as soon as possible when your scan is scheduled for."*

Q: No wonder I haven't had it done yet; I have been moved so many times they probably can't find me! In fact, that could explain a lot of things . . .

- *"I also apologize that you were moved in the wards so many times since admission. It is not acceptable to move a patient in the middle of the night unless it is clinically indicated to do so. I will raise this issue immediately with the ward sister and bed manager, and I assure you that it will not happen again."*
- *"Please, I also advise you to stay in hospital till scan of your chest is done and the course of the medications which are being given to you through the blood channels for your chest infection is completed. Do you have any concerns about your son's care?"*
- *"Do you have any other concerns you wish to talk about?"*
- *"I will write down my discussion with you in the patient's notes. I will also fill it in an adverse incident form with regard to the inappropriate transfer of a patient between wards out of hours."*
- *"I would like to say thank you for your time."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I will be in touch with you again soon in the clinic."*

51. Delay in investigation

Your role:	You are the doctor in an outpatient clinic
Problem:	Dealing with delay in staging CT scan of thorax and abdomen in a patient due for surgical resection of squamous cell carcinoma of lung
Patient:	Mr. Tariq Mehmood, 65 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient had hemoptysis 5 weeks ago. His CXR and bronchoscopy has confirmed that he is having a squamous cell carcinoma in the right upper lobe bronchus. He was told 4 weeks ago that the tumor can be resected after staging on CT scan of his chest and abdomen, if possible. It has been 4 weeks now that his CT scan of thorax and abdomen was requested but he has no information about the date of the scan yet. He is much worried about his cancer which might spread over time and might not be resectable if scan is delayed. He is naturally angry and wants to show his displeasure to you in clinic.

Your task: to acknowledge the unacceptable delay and propose a plan to rectify this.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in outdoor clinic. Are you Mr _________? Well, nice to meet you sir."*
- *"Well, I understand that you were having blood in phlegm and investigations which were done on you, they revealed a mass in your lung; and you were due for scan of your chest and tummy. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about the scan, when we can arrange it and to address your concerns. Is that ok? Will you tell me any of your concerns?"* ***(Silence)***

▶ Tell

▶ Help & Explain (Body of skill)

- *"I acknowledge that it has been delayed and should not have been."*

Q: Does the cancer can spread if scans are delayed?

- *"Yes, this is possibility. I can appreciate your concerns and can understand your feelings. Your disappointment is natural, if anybody tests are delayed, he will be disappointed, and he will be angry as you are. Also, I acknowledge that the scan is essential in the planning and treatment of your disease."*
- *"Whether you have been offered the details of a key person to whom you can contact if the scan date is not given....... Ok. "*

Q: Why is this taking so long?

- *"I will check it as there could be number of reasons like sometimes the wrong address, name or phone number is put on the request card. Sometimes, request card has not been filled in, CT scanner is broken down, no staff is available to do the CT session or scan has not been reported. Might be due any of these reasons, your scan date is not given. Anyway, I will sort it out."*

Q: What are you going to do about it? Help me – I'm frightened.

- *"I will raise the situation right now with my consultant, and will also speak to the CT scan consultant (radiologist) to arrange an appointment before you leave the clinic......"*
- *"On urgent basis, I have taken your date, and this is your date. It will not be delayed. I will follow it also and this is my number you can contact me."*
- *"Let me check your telephone number in the notes so that you can be contacted if needed."*

Q: I am still unhappy with the situation.

- *"I can arrange your meeting with my consultant so that you can explain the situation."*

Q: I am still dissatisfied and want to take further action about the delay in having the CT scan.

- *"There is a complaint process within the NHS. Do you want me to provide you any further information at this stage or you want it after you has seen the consultant?"*

Q: Doctor, what if my cancer would have progressed?

- *"If your cancer has progressed during the delay, then you have the right for formal complaint and to consider legal redress."*
- *"Do you have any other concerns you wish to talk about?"*
- *"I would like to say thank you for your time."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I will be in touch with you again soon in the clinic."*

52. A patient wanting to self-discharge

Your role:	You are the doctor in general medical ward
Problem:	Dealing with a patient wanting to self-discharge
Patient:	Miss Naila Shabbir, 20 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the relative and 4 minutes for discussion. You may make notes if you wish.

Scenario:

This patient was admitted 7 days ago with Listeria Monocytogenes meningitis. She was advised IV amoxicillin for 3 weeks in consultation with consultant microbiologist. She has recovered and is now able to go off the ward for a smoke. The course of IV antibiotics is not completed but she wants to go home on self-discharge. She has number of reasons for this. She has two small children at home and her sister has to take care of them as she is not there. She does not like the hospital food. She also does not like the attitude of some of the nursing staff towards her, particularly about the smoking issue. The IV medication is particularly irritating, and the nurse is deadly cruel in putting the cannula taking at least three attempts each time when it needs changing. The ward sister has tried to convince her to stay in the hospital, but she is insisting to go. The ward sister has asked you to speak to her that she should not go and to stay in the hospital till she completes the course of IV antibiotics.

Your task: to ascertain why the patient wants to discharge herself, discuss why it would be best to stay in the hospital and offer alternatives if she refuses to stay.

▶ Greeting

- *"Hello! Good morning. I am Dr ___________________, one of the doctor in the medical ward. Are you Miss _________? Well, nice to meet you madam."*
- *"Well, I understand that you were admitted with some infection of the coverings of the brain and you were being treated for that with the medications given through the blood channels of your arm. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your condition as well as the sister told me that you want to speak to me regarding going home. Is that correct? Will you tell me about your concerns?"* ***(Silence)***

▶ Tell

▶ Help & Explain (Body of skill)

Q: I am much better now and don't need the needle anymore in my hand. I just want to go home now.

- *"I appreciate your concerns and can understand this must be difficult for you, but I feel that it is wise for you to stay in the hospital with us. This infection can be serious if you will not get the proper and full treatment through the blood channels. You can have many complications from it, if not treated properly like nerve palsies, stroke. You can infect others as well."*

Q: Doctor, I have two small babies at home. I also don't like the food of the hospital and the attitude of the staff?

- *"If you will go like this that you are not completely recovered and still the course of treatment is not completed then you may infect your kids at home. Your sister is there, and you can talk any of your other relative to be there or any other care taker to help your sister to take care of your kids. If you don't like the* *food of the hospital, we can appoint someone to bring food for you from the home. If you feel problem while putting a new cannula by the nursing staff, then I can do it for you. I will also speak to nursing staff whom attitude you don't like."*

Q: Why I am being bossed like a child? I can't stay in the hospital.

- *"If still you want to go then you will have to take responsibility for your own care in this situation and you will be advised to sign a formal statement that you have been advised but you are taking your own discharge against medical advice."*

Q: I will not sign any such statements.

- *"Ok, I will make entry in your notes that what has happened, your reasons for leaving and the advice which was given to you. I will write everything in it."*

Q: You can't stop me from going. Can you give me tablets to take them at home?

- *"I request you to wait till I can talk to the consultant for infectious diseases (microbiologist) as we are giving you the medications through your blood channels. But when you will be in home, it would be difficult for you to take the medication through blood channels. So, I need to write some tablets for you, and only he can advise it. So, it is wise that you should wait for some time."*
- *"Do you have any other concerns you wish to talk about?"*
- *"I would like to say thank you for your time."*

▶ Referrals --

▶ Reassure --

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall --

- *"I will be in touch with you again soon in the first available clinic."*

- Some patients are disturbed due to sleep deprivation during hospital stay and want to go home because of this issue.
- Patients, who are competent and does not show signs of psychiatric illness likely to impair their capacity for deciding, cannot be kept in the hospital against their will. Doctor's responsibility is to inform the patient about the importance of staying and the patient will be taking full responsibility for their self-discharge. However, specific follow up arrangements should be made for such cases.
- Failure to ensure that the patient has full capacity to make these decisions, regarding their own healthcare and hospital stay, could mean that the clinician is negligent in not providing best care for the patient.
- Patient wanting for self-discharge should not be punished for doing so. If they require medication, then it needs to be provided. Specific follow up is necessary.
- It is advisable to inform the consultant as well as the patient's GP so that if the patient falls ill again then the GP will be aware of the prior situation.
- Advise the patient about what they need to do if they feel unwell or worse when they get home.
- Situations in which patient's mental state is assessed to know that they have the capacity to self-discharge or not:
    - patients under the influence of alcohol or other drugs
    - patients admitted with acute or chronic confusional states, including delirium
    - those with a diagnosed or suspected mental health illness which could impair their decision-making capacity
    - children under the age of 16

H. PROFESSIONAL ISSUES AND COMMUNICATION WITH COLLEAGUES

- A colleague with hepatitis B infection
- A colleague with a needle stick injury

53. A colleague with hepatitis B infection

Your role:	You are the doctor in a large district general hospital
Problem:	Discussing about HIV testing
Patient:	Dr Nasir Soomro, 26 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

Dr Soomro is a young surgical FY2 doctor where you work. He's a bright career-minded young doctor. He tells you that an occupational health hepatitis B test has found him to be HBsAg positive. The results also state that he has no HBe markers but that further tests are necessary. He is from overseas and has never had hepatitis B immunization. He is clearly upset as it may affect his career. He cannot understand how he has acquired the virus. He wants to speak to you for more advice.

Your task: to counsel him about his recent positive finding with an explanation of the results, advise him on how this may affect his career and what he needs to do next.

▶ Greeting

- *"Hello! Dr ________________."*
- *"Well, I understand that you acquired hepatitis B surface antigen. Is that correct?"*

▶ Agenda setting

- *"Well, I am here to discuss with you about your clinical condition and what we can do further. Is that Ok?*

▶ Tell

- *"First of all, I am very much grieved to know this, and I am feeling very sorry for you that you are young and bright carrier minded doctor. So, I can understand that of course you will be worried about your health and career." **(Golden silence)***

▶ Help & Explain (Body of skill)

- *"Do you have any idea where you may have acquired the virus from?"*
- *"What type of surgeries you have assisted in the past? Had you any needle stick injury while doing the surgeries?"*
- *"Do you have a partner? Do you know her hepatitis B status? Is she immunized?"*
- *"Whether you had any tattooing, piercing or blood transfusion in the past?*

Q: How serious is it to have a positive HBsAg result? Does it mean I have active hepatitis infection?

- *"I can understand your concerns, but to know whether your hepatitis infection is active or not, we need to know about your lab tests? ..... What about your HBeAg, anti-Hbe? ..... What about your HBV DNA levels?"*

Q: What does this mean for my surgical career? Will I be able to join the surgical rotation?

- *"If you are HBeAg positive, then you would have restrictions imposed on your practice."*
- *"If you are anti-HBe negative or have no HBe markers, you will need to have hepatitis B virus (HBV) DNA genome levels measured. If this is between 10^3 - 10^5 copies/mL, then you may still be able to carry out exposure-prone procedures whilst on antiviral treatment. If it is under 10^3 per mL, then you will have to have levels tested annually but no restrictions will be imposed."*
- *"If HBV DNA genome levels are above 10^5 per mL, you will be restricted in carrying out procedures where there is a risk that injury to the healthcare worker could result in their blood contaminating a patient's open tissues. This would include where a worker's gloved hands may be in contact with sharp instruments, needle tips or sharp tissues (e.g. bone spicules or teeth) inside a patient's open body cavity, wound or confined*

anatomical space where hands or fingertips may not be visible at all times. This would obviously include open surgical techniques."

Q: Should I let my consultant know about this positive result? Will he stop me from operating straight away?

- *"You should inform your consultant and you should cease to perform any surgery until you have been properly assessed by the occupational health physician."*
- *"I am sorry to tell you but it's an advice that you might have to retrain yourself in a low-risk specialty if your practice does have to be restricted. Your employer may make an effort to arrange suitable alternative work and offer retraining opportunities. Postgraduate medical and dental deans also play an important role in retraining or redeploying doctors affected."*
- *"The NHS Injury Benefits scheme and the Industrial Injuries Disablement Benefit scheme provide benefits where hepatitis B has been occupationally acquired."*
- *"I reassure you that your confidentiality will be paramount, but some staff will need to know. The occupational health physician will be informed because he may decide on contact tracing of patients who may now be at risk from you. This contact tracing is very important whenever such communicable disease is coming. In the contact tracing we will see the patient has which friends, which type of relation he has with the friends and how this disease is spreading."*
- *"You may need to tell medical staffing at future hospital which you will join."*
- *"You have to take care of your close contacts. If you have a partner, you should either avoid sex or use condoms and must get your partner immunized after checking their HBsAg status. If using injectable drugs, then avoid sharing needles. This is for the safety of your sexual partner as well as your drug partner."*
- *"Do you have any concern that have not been addressed ...... ok."*

▶ Referrals/Leaflets & societies

- *"I am going to book your appointment with the occupational health physician who may refer you to a hepatologist for a specialist clinical assessment."*

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far."* ***(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

- All hepatitis B-infected healthcare workers who are e-antigen negative and who perform exposure-prone procedures or clinical duties in renal units must be tested for viral load (hepatitis B virus DNA).
- Healthcare workers without the e-antigen, and who are refusing to have their viral load tested, should not be allowed to carry out exposure-prone procedures in the future.
- The latest guidelines from the Department of Health state that healthcare workers who are HBeAg negative but have HBV DNA levels $>10^5$ copies/mL should be stopped from performing exposure-prone procedures (EPP), whether they are on antiviral treatment or not.
- However, those who are HBeAg negative but have pre-treatment HBV DNA levels of between 10^3 and 10^5 copies/mL can be allowed to perform EPP whilst on antiviral treatment provided their DNA levels fall to below 10^3 copies/mL after starting treatment. The recommendations are to monitor HBV DNA levels 3-monthly whilst on treatment to ensure that they do not rise above 10^3 copies/mL.
- If a clinician decides to stop antiviral treatment, he should also stop performing EPP immediately. If his HBV DNA levels remain $<10^3$ copies/mL a year after stopping treatment, he will be allowed to return to performing EPP, subject to further tests 6–12 monthly.
- The Department of Health guidelines clearly state that healthcare workers infected with hepatitis B should be entitled to the 'same right of confidentiality as any other patient receiving medical care'. Therefore, while the healthcare worker's employer may need to be informed by occupational health staff that a change in the employee's duties should take place, his/her hepatitis B status itself should not be disclosed without the individual's consent. However, where patients are, or have been, at risk it may be necessary in the public interest for the employer to have access to confidential information.

54. A colleague with a needle stick injury

Your role:	You are the medical CT1 on-call with your recently qualified FY1
Problem:	Discussing the management with a colleague having needle stick injury
Patient:	Dr Rabia Jan, 24 years old

You have 2 minutes to read the scenario printed below. When the bell sounds, enter the room. You have 6 minutes for your consultation with the patient and 4 minutes for discussion. You may make notes if you wish.

Scenario:

Dr Jan is your new FY1 doctor. She has clerked a known HIV patient and while taking blood tests, she had a needle stick injury. She is 4 months pregnant as well. She is extremely upset and comes to you.

Your task: to calm the situation, to advise her about the management of a needle stick injury and to discuss the need for antiretroviral therapy.

▶ Greeting

- *"Hello! Dr ____________________."*
- *"Well, I understand that you have needle stick injury from the known HIV patient. So, will you tell me what has happened? ...."*

▶ Agenda setting —

▶ Tell —

▶ Help & Explain (Body of skill)

Q: Recently, I came to know that I am 4 months pregnant. Could this injury or the medications I have to take, harm my baby?

- *"Do not be panic and keep yourself calm because it will impair your thought processes."*
- *"I can understand your concerns for your baby, but it will be dealt with. I will speak to your obstetric consultant about this incident and she will advise you the best."*

Q: What is the risk of me contracting HIV?

- *"I am very sorry to know it and I can understand that it is a difficult situation for you but the risk of acquiring HIV is very low in this condition. It's 0.3%. But I am sorry and afraid to tell you that there is a risk of contracting hepatitis B and C as well."* ***(Silence)***
- *"Whether you have you been immunized against hepatitis B?"*
- *"Please immediately wash your contaminated area thoroughly with the soap and water but avoid scrubbing and allow the wound to bleed freely."*
- *"Can you tell me that how this happened? .... What was the type and size of needle? .... What was the depth of penetration? .... The amount of bleeding produced. ..... Any visible patient's blood on needle? ..... What was the exact time of the needle stick injury? ...."*
- *"Who the patient is? What is his HIV, hepatitis B and C status?"*

Q: Do I need to start prophylactic antiretroviral treatment straight away?

- *"You should start the initial triplet treatment within first hour."*

Q: Whom should I see to get the tablets?

- *"I will ring the occupational health physician immediately for advice on established hospital guidelines. But if this incident had happened out of normal working hours, the senior nurse in the casualty knows what the* *guidelines are and where anti-HIV triple therapy starter pack is kept. PEP drugs should be initiated soon after the incident (within hours if possible, no later than 72 h); they should be continued for 28 days at least."*

Q: For how long I have to take treatment? Are there any unwanted effects of treatment?

- *"Treatment will be for 4 weeks and you must watch out for side-effects such as sickness and a rash."*
- *"You should also observe for the symptoms of the disease as well (seroconversion)."*
- *"Are you on any medications, as there are possible drug interactions?"*
- *"You need to be followed up regularly by the occupational health team."*

Q: What is the risk of passing HIV to the baby?

- *"Without interventions, rate of vertical transmission is 15-20%; prolonged breastfeeding doubles this, falling to <2% with antiretroviral prophylaxis, elective Caesars and bottle feeding."*
- ***"Management:** Perinatal antiretrovirals for HIV +ve mothers + Caesarean birth + bottle-feeding."*

Q: Whether this treatment will affect my pregnancy?

- *"Nucleoside reverse transcriptase inhibitors (NRTI) zidovudine and lamivudine are not contraindicated in pregnancy. In fact, zidovudine is shown to be particularly effective in preventing HIV transmission to the foetus due to its ability to cross the placenta. The drugs which are harmful will not be given to you. Drugs which are useful, they will be added to the drug regimen."*
- *"NNRTI efavirenz is contraindicated. The preferred protease inhibitor (PI) and NNRTI drugs in pregnancy are ritonavir and nevirapine."*

Q: Do I need any HIV testing?

- *"I will advise you to undertake an HIV test. Without it, it will be difficult to claim compensation, if you were found to be HIV positive at a later date."*
- *"Sometimes the first test can be negative and then a repeat test is recommended in up to 2-week time. There are different types of tests like 10-minute positive test, early positive test and 2-week positive test."*
- *"Your blood taken will also be tested for hepatitis B and C as well."*
- *"HIV retesting will be done again 6 months after stopping prophylaxis."*
- *"Until then, you should decide how to tell your partner what has happened with consideration of practicing safe sex using barrier methods, i.e. condoms."*

Q: Will my test remain confidential?

- *"Your test will be kept confidential and only the occupational health physician will know it. This is only because this is needed for your proper follow up and if you have any problem, they will handle you better **(encourage)**. You need to tell your partner about your HIV test result **(essential)**. Avoid blood donation."*
- *"The occupational health physician will report the case (in absolute confidence) to the Public Health Laboratory Service (PHLS) Communicable Disease Surveillance Centre (or Centre for Infection and Environmental Health in Scotland)."*

Q: Do I myself need to counsel the patient for testing of hepatitis B and C?

- *"You will not counsel the patient for testing. I will explain him what has happened, and I will counsel him for a hepatitis B and C test with consent. Patients with unknown HIV status cannot have HIV testing without their consent."*
- *"If there is anything that you are not sure about?"*
- *"You should go off duty and I will try and arrange some cover."*
- *"Do you have any concern that have not been addressed .... ok."*

▶ Referrals/Leaflets & societies

▶ Reassure

▶ Recap (you recap, patient recap)

- *"So, I am going to repeat what I have let you know so far." **(Summarise everything)***
- *"So now, if you can just tell me what I have let you know so far, so that I can add which might you miss?"*

▶ Recall and follow ups with contact details

Universal 'opt-out' policy for HIV testing:

- Individuals coming into contact with healthcare services are offered an HIV test as routine, but they can refuse it.

UK national guidelines for HIV testing:

- First-line testing should be fourth-generation assays which test for both HIV p24 antigens and IgG antibodies simultaneously. This test can give a positive result within 4 weeks of acquiring the infection and can have a sensitivity and specificity of over 99%. Positive screening test should be repeated with a second sample and also be sent for confirmatory testing.

  Note:

  - 'Point-of-care' testing can give a result as quickly as 10 min and can be done from fingerpick or mouth swab samples. However, since these methods only test for antibodies, the reported sensitivity is lower, especially if the patient is still within the window period (currently 12 weeks).
  - Serological tests usually test for HIV-1 infection. Therefore, patients with HIV-2 infection (which is more prevalent in West Africa) can have an indeterminate result. Other possible causes for an indeterminate result include early stages of seroconversion and advanced HIV infection (when the antigen levels are too low).

Human Tissue Act 2004: code of practice

- In the absence of consent from the patient (now deceased) and the absence of assent being able to be obtained from a 'qualifying person', blood could not be taken for an HIV test for the sole purpose of benefiting another person.

Q: Is it ethical to perform an HIV test following a needle-stick injury where a patient is unable to give consent?

Q: What if the patient has died?

- In the event of a deceased patient being the source of a needle-stick injury and whose HIV status is unknown, the taking and testing of samples requires consent in accordance with the Human Tissue Act 2004. Assuming the deceased did not give consent (or refuse it) while alive, this can be obtained from a "nominated representative" (if appointed) or by a person in a "qualifying relationship" to the deceased.

Post-exposure prophylaxis

Factors increasing the risk of occupationally acquired HIV infection:

- Deep injury, visible blood on the device causing the injury, injury with a needle that has been placed in the patient's vein or artery, terminal HIV-related illness in the source patient.

PEP drugs:

- **In pregnancy**: zidovudine 250 mg bid, lamivudine 150 mg and lopinavir/ ritonavir 200/50 mg 2 tablets bid.
- **In a nonpregnant:** tenofir and emtricitabine are the preferable NRTIs.

Side effects of PEP

- Diarrhoea, vomiting, AKI

Risk of acquiring HIV after needle stick injury

- 0.3% of recipients would get HIV based on a hollow needle-stick together with a high-risk donor and a deep injury to the recipient.
- Wearing gloves might reduce transmission by 50% (but this is an estimate)
- As citizens we have a public duty to allow the test in the best interest of the healthcare worker.

CLINICAL MEDICINE

For MRCP PACES and FCPS

This book is expected to be extremely helpful in passing long cases, short cases and communication skills scenarios in internal medicine for both inland and foreign exams. To improve the skill of long cases, this book provides a comprehensive design of history taking template followed by grasping the common symptoms encountered during day to day clinical practice and finally the detailed discussion on common long cases. Short cases section of this book is designed to help the candidates to improve clinical methods, presenting findings of examination smartly and brief discussion on the cases. Communication skills section of the book provides a graspable method to deal with the difficult scenarios posed by the patient to candidate with appropriate answers. This book has been intended to provide a single platform to comprehensively grasp the vast subject instead of searching variety of books. Your prayers will be our reward for this years long hard work.

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